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A Representative of the Director-General of Health Services, Government of India.

The Director of Health Services, Chandigarh (Punjab) or his nominee.

Dr. V. Ramalingaswami, Professor of Pathology, All- India Institute of Medical Sciences, New Delhi.

The Director of Health Services, West Bengal, or his nominee.

Dr. K. Mitra, C. I. T. Plot No. 114, Badan Roy Lane, Calcutta-10. *(Convener)*

Working Party on 'Lathyrism'

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Dr. (Mrs.) K. T. Ganapathy, Medical Specialist, Gandhi Memorial Hospital, Rewa.

Dr. M. Swaminathan, Assistant Director, Central Food Technological Research Institute, Mysore.

Dr. R. V. N. Sinha, Nutrition Officer, Bihar, Patna.

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Dr. Eleanor D. Mason, University Settlement, Reynolds Road, Bycula, Bombay.

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Working Party on Carbohydrate, Fat, Vitamin and Mineral Metabolism

Dr. M. C. Nath, Professor of Biochemistry, Medical College, Nagpur.

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Sub-Committee for Compiling Data on Physiological Norms of Indians

Dr. V. N. Patwardhan, Director, Nutrition Research Laboratoriees, Coonoor. (*Convener*)

Dr. B. K. Anand, Professor of Physiology, All-India Institute of Medical Sciences, New Delhi.

Dr. J. D. Pathak, Professor of Physiology, Medical College, Baroda.

Dr. J. C. Sachdev, Dean, Medical College, Jabalpur.

Dr. R. C. Shukla, Head of the Department of Physiology, K. G. Medical College, Lucknow.

Sub-Committee for Compiling Information regarding Facilities, etc., on Physiological Problems in Medical Colleges

Dr. B. B. Dikshit, Director, All-India Institute of Medical Sciences, New Delhi. (*Chairman*)

Dr. J. D. Pathak, Professor of Physiology, Medical College, Baroda.

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Dr. G. K. Karandikar, Professor of Pharmacology, Medical College, Baroda. (*Secretary*)

Working Group on Aviation Medicine

Air Vice-Marshall S. P. Bhatia, Director of Medical Services (Air), Air Headquarters, New Delhi. (*Convener*)

Sq. Leader B. Bhatia, Senior Scientist, Defence Science Organisation, National Physical Laboratory, New Delhi.

Prof. M. L. Chakravarty, Professor of Physiology, [illegible] Calcutta.

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Committee for Developing Standard Methods of Analysis of Water, Sewage and Trade Effluents and Formulating Standards of Quality, Etc.

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Shri K. Venkataramanan, c/o Directorate-General of Health Services, New Delhi.

Dr. K. G. Veeraraghavan, Chief Water Analyst, King Institute, Guindy, Madras. *(Secretary)*

III. TECHNICAL REPORT OF THE RESEARCHES CARRIED OUT DURING THE YEAR 1958

The researches carried out during the year under report were recommended by the Scientific Advisory at its meetings held in Lucknow on the 20th and 21st Dec 1957 and were approved by the Governing Body of the Indian Council of Medical Research at its meeting held in New Delhi on the 29th March, 1958. *The views expressed by the individual workers are not necessarily the views of the Council.*

CLINICAL RESEARCH

1. Clinical research unit under Dr. V. R. Khanolkar at the Indian Cancer Research Centre, Bombay.

1. A study on the non protein nitrogen (NPN) constituents of serum and urine in healthy subjects and in cases of liver and kidney dysfunction was continued and the following normal and pathological cases were studied:

Cases		*Number*
Healthy subjects	...	31
Cirrhosis of liver	..	6
Cancer with secondary liver dysfunction	..	6
Cancer with secondary kidney dysfunction	..	7

The following conclusions have been drawn:

(i) The urinary excretion of ammonia N in liver cirrhosis cases is high in comparison to that of healthy subjects, while the excretion of NPN, Urea N, Uric acid and Creatinine is lower than that in healthy subjects. This finding is in agreement with that of Pain and Banerjee (*Indian J. M. Res.* 45 · 35, 1957) who have studied urinary excretion of NPN constituents in cases of cirrhosis of liver.

(ii) Liver or kidney dysfunction cases, complicated with cancer, do not show significant changes in the serum and urinary levels of NPN constituents.

2. Estimation of Gonadotropic Hormone (GTH) Levels in urine by a chemical method : The chemical method for the estimation of GTH depends upon the selective adsorption of the hormone on $Al(OH)_3$. Since phenol, tyrosine and albumin give the same colour reaction with Folin-Ciocalteu reagent as gonadotropins, a study of the specificity of adsorption of GTH on Al $(OH)_3$ was considered essential. Control experiments, therefore, were carried out with addition of phenol, tyrosine and albumin to urine samples and it was found that these substances

were not adsorbed on $Al(OH)_3$ as did the gonadotropins, but remained in solution. Having established this fact, estimations of the GTH in male and female urines were carried out by the method described in last year's report. Results of the work are summarised below :

Material	*No. of subjects*	*GTH**	
		Range	Mean ± S.E.
Normal males	33	2.78 — 18.5	8.19 ± 0.70
Normal females	6	5.20 — 9.30	7.46 ± 046

*Expressed as mg. of casein in 24—hour urine sample.

Since morning samples of urine in the case of pregnancy and vesicular mole are known to contain high percentage of GTH, four samples from both these categories were estimated by the method mentioned earlier and, as expected, high values for GTH were obtained. In cases of testicular tumour (6), vesicular mole (4) and pregnancy (9) also a high titer of GTH, was obtained.

Bioassays of GTH on immature mice (19-21 days old) using estrone as reference standard (as suggested by Rosenberg et al., Endocrinology, 16: 337, 1957) were also carried out. The values obtained by the method were in conformity with those obtained by the chemical method.

2. Neurological unit under Dr. V. R. Khanolkar at the Indian Cancer Reserch Centre, Bombay.

I. Pathology of Kyasanur Forest Disease.

(a) During the year, material from one human autopsy, and from 35 monkeys collected from the forest areas in Mysore and 18 monkeys inoculated in the laboratories of the Virus Research Centre, Poona, was received for study. The pathological findings in the brains and viscera were essentially similar to those encountered in the specimens received during 1956-57, and were consistent with the view that Kyasanur Forest Disease is a viraemia with haemorrhagic manifestations.

[illegible]

material from three cases of an acute illness termed "Gurkha Infant Disease" the most striking feature of which was an unusual elevation of the protein content of the C.S.F. The pathological findings in this material are being prepared for publication.

(c) In addition to the specimens mentioned under items (a) and (b) 122 other specimens of neuropathological interest were received by this Unit for study. Included among these are the brain spinal cord and viscera of a case of suspected lathyrism and specimens from four horses suspected to be suffering from equine encephalitis.

II. Studies in Lathyrism

Experimental observations on a modified approach to the production of lathyrism in animals, referred to in previous reports are being concluded. The results obtained so far do not support the hypothesis on which this modified approach was based.

III. Observations on Pyridoxine Deficiency

Biochemical observations on blood and liver tissue of rats with induced pyridoxine deficiency (both dietetic and with the use of desoxy-pyridoxine) and on one monkey with a pure dietetic deficiency have been concluded. Histological examination of the tissue of these animals is in progress.

IV. Neurophysiology Section

As a preliminary step to the development of this section, 12 full electronic instruments have been assembled and tested.

3. Clinical research unit under Dr. R. N. Chaudhuri at the School of Tropical Medicine, Calcutta.

A. *Amoebiasis :*

Experimental study.—Studies were made with the aid of a small apparatus, which can be permanently fixed into the caecum of experimental animals (guineapigs) as reported last year, and through which a crude culture of *E. histolytica* can be introduced to cause infection of the intestine or caecal contents withdrawn to observe the behaviour of the amoebae (e.g. under the influence of drugs). It permits a variety of observations without sacrificing animal. With the fixture *in situ* the animals can thrive almost normally for an indefinite period and the tube if cleansed from time to time, maintains its patency.

Such animals when inoculated with 48 hours' crude culture of *E. histolytica* directly into the caecum through the tube usually acquire the infection within a period of 8 to 10 days. In a few instances, the animals had to be inoculated for the second or even third time, for successful infection. The trophozoites gradually increase in number as revealed by daily examination of caecal contents. The animals become sick with disinclination for food and lose considerable weight but without any diarrhoeic manifestation. They eventually die in about 4 to 8 days after infection. Autopsy reveals typical ulcers in the caecum, the scraping from the wall showing numerous trophic forms of parasites.

With this preliminary observation, it was considered worthwhile to explore the possibility of utilising this method for screening of amoebicidal drugs. Altogether five different amoebicidal drugs were tried and the progress during treatment was assessed by daily examination of caecal contents for *E.histolytica*. The animals that responded to the drug were followed up for relapses with bi-weekly examination of caecal contents. The results obtained with different drugs are as follows :

(*a*) *Emetine-Bismuth Iodide* was tried in a group of four infected guineapigs in a daily dose of 1 mg. for 10 days. Two animals responded on the 4th and 6th day of treatment and during 2 weeks' follow-up period there was no relapse, while in the remaining two it proved ineffective. No toxicity was observed.

(*b*) *Carbarsone* in a daily dose of 25 mg. was given to four infected animals and all of them responded on the 2nd and 3rd days, of treatment. But the drug being very toxic was discontinued on the 4th day. No relapse was observed during two weeks' follow-up.

(*c*) *Kurchi-Bismuth Iodide* was tried in four infected animals in daily doses of 128 mg. for 10 days. The caecal contents became negative of *E.histolytica* on the second and fifth days of treatment in 2 of them and both had a relapse after 17 and 38 days, respectively. In the other two animals the drug was ineffective. There were no toxic reactions.

(*d*) *Ipecac-Bismuth Iodide complex* was administered to a group of eight guineapigs in a daily dose of 6 mg. for 10 days. Three animals responded on 3rd, 6th and 8th days of treatment respectively, of whom

one died apparently of drug toxicity on the 9th day of treatment, one relapsed after five weeks and the remaining one remained well during three weeks' follow-up. Toxic reactions were observed in four animals.

(e) *Mebinol V* (ethoxy-ethyl-phenoxy-nitro-benzyl-dichlor-acetamide) was tried in eight guineapigs in a dose of 120 mg. daily for 10 days. Six animals responded within 2—4 days of treatment all of whom relapsed between 9 and 35 days after the completion of treatment In the remaining two the infection was uninfluenced. No toxicity was observed.

Without commenting on the efficacy of the drugs from the limited observation it appears that the above technique is suitable for the study of experimental amoebiasis not only in determining the onset and course of amoebic infection but also in screening of chemotherapeutic agents. It may as well facilitate recognition of relapses and resistance of the organisms to drugs and influence of diet, bacteria and other measures on the infection.

B Tropical Eosinophilia :

The unit undertook (i) studies on the role of parasitic infection in its aetiology and (ii) clinical studies.

(i) *Experimental study.*—Eosinophilic response in animals fed with ascaris larvae—Twenty-four rats were fed with a suspension of embryonated eggs of ascaris lumbricoides (supplied by the Helminthology Deptt. of the School) in normal saline having 1000—3000 eggs per feed. The blood was examined before the experiment and thereafter on alternate days or twice a week throughout the experimental period. The rats were divided into two groups of twelve each according to the regime of feeding, as shown below :—

[illegible] s. There
[illegible] level 0-2
[illegible] of 10-22
per cent on the 9th to 13th days after the first feed. Such a rise, however, came down to normal spontaneously within the next 3-6 days. During the period following the second and third inoculations there was still higher rise of eosinophils though temporary up to 28 per cent (absolute count 2300/c.mm). With subsequent feeding the response was, however, very poor.

Group 2 : To ascertain if this process of transitory increase of eosinophils may be perpetuated the other twelve rats were fed with the same dose daily for 4 weeks. The resulting eosinophil percentage up to a maximum of 30 per cent (absolute count 3700/c.mm) persisted for a longer period (one to three weeks) but came down spontaneously although the feeding was continued.

In eight control rats fed similarly with normal
tage of eosinophils varied between 0 and 3.

In another set-up sixteen guineapigs were fed with 300 to 500 embryonated eggs suspended in normal saline daily for 6 weeks. The range of initial eosinophil count was between 0 and 4 per cent. All the animals showed increase of eosinophils in peripheral blood after 9 and 13 days of experiment and the maximum rise of 20 to 33 per cent was attained on 14th to 32nd days. Thereafter a gradual fall was noticed inspite of regular feeding being continued. The animals were again fed with a single dose of eggs (3000) showing little or no eosinophilic response.

Skiagram of lungs taken at the height of eosinophilia in six animals did not show any significant change.

The histological examination of lungs of these animals showed marked eosinophilic infiltrations with fragments of ascaris larvae in some areas.

It appears that ingestion of embryonated ascaris eggs causes eosinophilia with eosinophilic infiltration of lungs. The eosinophil cells increase in number if the dose is repeated two to three times. But in any case, the effect cannot be perpetuated by subsequent feedings even with high concentrations of larvae. This simulates the syndrome described in 1932 by Loeffler, who held that it was an allergic response to migration of ascaris larvae in the lung. It is possible that with repeated re-infection some immunological reactions develop in the host which prevent eosinophilic response to occur indefinitely.

(ii) *Clinical study.*—Diethyl carbamazine tried in 90 cases of tropical eosinophilia in doses of 8-12 (50 mg. each) daily for varying periods. The results were usually good, but seven patients failed to respond. In most cases, the pulmonary symptoms and signs disappeared within a week and the blood count reached the normal level in 2—5 weeks on an average. Its toxicity was low. Seven out of thirty-two cases followed up for a period of 1—2½ years had a relapse which responded well to the same drug again. None of the thirty cases followed up for one year or less had recurrence.

C. *Liver in diabetes :*

Following detention of diabetes in a few cases of chronic obscure splenomegaly, the Unit undertook studies of liver to find out its correlation if any, with the degree, duration and/or treatment, diet, etc., of diabetes.

(i) *Experimental study.*—To find out the significance of liver involvement in the course of alloxan diabetes some experiments were carried out in 3 groups of rats, one of which was control. In the other two groups the liver was damaged by carbon tetrachloride injections or by a synthetic diet for six weeks which produced fatty changes or cytoplasmic degeneration of the liver cells.

It was observed that—(i) If the animals (normal) are starved for 24 hours and then given a single injection of alloxan in a dose of 20 mg. per 100 g. of body weight, hyperglycaemia and glycosuria are produced, in most of them in 2-3 days. (ii) If the liver is damaged

in the way described above the diabetic condition appears much earlier.

[illegible] years, [illegible] ration [illegible] 7 years [illegible] ble in six. Total serum protein, albumin/globulin ratio and thymol turbidity values did not show any significant alteration except in 2 cases of 4 and 7 years duration. Serum bilirubin was normal in all. Liver biopsies showed no significant change in histology except moderate fatty change in 2 cases and nuclear vacuolation in three.

4. Schistosomiasis enquiry under Dr. R. K. Gadgil at the Gra Medical College, Bombay.

Infection of Ferrissia tenuis.—During this period attempts w mainly directed for obtaining an adult schistosome from the infected a mals in the laboratory. With this aim in view, following experimen were carried out. During the various periods small and large batch of Ferrissia tenuis snails were infected with the *miracidia of S. haem tobium*. Certain variations were made with the *methods of infection* each batch. It is our experience that whatever methods we follow, th high mortality rate in the infected snails could not be prevented. had been possible to infect the snails but the number of cercariae ob tained was very small. The number of snails that survived the perio was also considerably low. These difficulties created a major problem in obtaining large number of cercariae for the infection of animals in the laboratory as well as at the village Gimvi. However, with the small number of cercarie available, animal infection experiments were also carried out.

On re-assessing the difficulties in these infection experiments it was decided to infect the animals in the area of the endemic focus. Small pools of water were prepared in the rivulet itself, and snails were infected in these pools under natural conditions. The infection of these snails was possible because of the co-operation of the village school-teacher, who directed the pupils to pass urine at these selected spots. Snails were collected from these spots after a month, and animal infections were carried out. It was noted that the cercarial yield was very low in this case. It is proposed that this would be the method of choice to be followed for obtaining an adult worm.

Infection of animals.—In the month of March, April, 1958, 12 mice were infected at Gimvi with the cercariae emitted by the naturally infected snails. Three such infections were given. All these were found to be negative after a period of 3 months. In May, 1958, similar infections were given to 18 mice at Gimvi. These animals also failed to take up the infection.

In the laboratory 10 mice were infected in the aquaria containing the infected *F. tenuis*. Three such infections were given. These also proved to be negative.

Six mice were infected with the cercariae emitted by the Indo-planorbis exhustus snails. Out of these only one mouse showed the presence of 6 adult worms of Schistosoma spindale.

Viability of ova.—Experiments on the viability of ova were carried out with the medium of different types of soils. It was observed that in the soil consisting of fine gravels, moistened with water, ova were viable up to 48 hours.

Examination of stool samples.—Along with this work certain other investigations were undertaken. In one previous report, a case of schistosomiasis from Mudh-Island was reported. The ova were detected in stools. Similar cases were noted by Dhanda, (1956) in Delhi. It was

decided to examine consecutive samples of stools from the O.P.D of the J. J. Group of Hospitals The stools were examined by different [illegible] ormaldehyde Con- [illegible] s (1955). It was [illegible] were moro satisfactory in comparision with the other methods. The incidence of *E histolytica* was 25.12 per cent, *Giardia* was 14 39 per cent and *Ascaris* was 10 37 per cent.

A similar type of work was undertaken later. 274 stool samples were examined from the village Depoli of Palgarh taluka. Incidence of round worm was as high as 73 4 per cent. Whip worm was 59.7 per cent *E. coli* was 28 9 per cent and *E. histolytica* was 18 6 per cent Schistosome ova were not detected in any of the samples.

5. Inquiry into the use of artificial hypothermia (Hibernation) in open intracardiac surgery under Dr. P. K. Sen at the Seth G. S. Medical College, Bombay.

Altogether sixty-five experiments have been carried out during the year. Work was done under two main heads :—

A. *Studies in extreme hypothermia*—to carry out open 'dry' cardiotomy on completely non-pulsatile 'standstill' heart with a view to exclude cerebral anoxia, ventricular fibrillation and air embolism. A group of eighteen experiments to study the behaviour of the heart at low temperatures ranging from 23°C to 10°C, have been carried out.

B. *Studies in elective cardiac arrest*—for open cardiac surgery, with cardioplegic drugs combined with, or without hypothermia. This work has been done in the following six phases :—

1. Use of potassium citrate alone.
2. Use of acetylcholine alone.
3. Combination of potassium citrate in different concentrations with acetyl-choline, at normal body temperature.
4. Combination of potassium citrate with acetyl-choline under hypothermia.
5. Combination of potassium citrate with acetyl-choline under hypothermia, using 10per cent sodium lactate to wash out the cardioplegic drug from the coronary circuit.
6. Combination of potassium chloride with acetyl-choline under hypothermia.

(A) Experimental Procedure

Adult mongrel dogs were anaesthetised with intravenous sodium pentothal (30 mg. per Kgm. body weight); an endotracheal tube was inserted and the lungs ventilated at the rate of 48 times per minute by a positive pressure respiratory pump. Venesection was done and an intravenous drip of 5 per cent glucose started. Electrocardiographic control tracings were taken and animals immersed in ice cold water (0° to 4°C temperature) after recording the original temperature with a rectal electric thermo-couple. The rectal temperature and the E.C.G. records were maintained every ten minutes. When the required low temperatures were obtained cold water was siphoned off and replaced by tap water. The temperature of the bath was raised to 45°C by addition of warm water and the animals re-warmed to their original temperature.

Out of 18 dogs, thirteen went into complete cardiac arrest. Five of these did not recover on re-warming while eight were completely revived. The remaining five dogs showed a heart rate of 4 to 8 per minute at the lowest temperature of the experiment. Of these, one died during re-warming, two died 4 hours after they had been restored to their original temperature while two survived.

The cooling time during all these experiments varied from 1 hour 30 minutes to 5 hours 50 minutes The period of arrest in the animals that were revived varied from 8 to 25 minutes.

In our previous work on extreme hypothermia a series of 18 dogs were cooled to temperature 5 between 9°C to 15°C. Complete cardiac arrest was obtained in 7 animals of which only 3 could be revived back, the other four did not register any heart-beat on re-warming. In the remaining 11 animals, heart rates from 4 to 6 per minute were obtained at the lowest temperatures of the experiment. All of these were revived on re-warming. Cooling time for arrest or near-arrest stage varied from 1 hour 25 minutes to 3 hours 10 minutes. Period of arrest in the animals that were revived varied from 20-45 minutes.

(B) Experimental Procedure

Adult healthy mongrel dogs weighing between 10 and 15 Kgm. were used. Anaesthesia was induced by intravenous sodium pentothal (30 mg per Kgm. body weight) No predication was employed. Animals were kept on positive pressure ventilation with air by a respiratory pump through an endotracheal tube at the rate of 20 per minute except when hypothermia was used where the rate was kept at 48 per minute.

The chest was opened transversely through the 4th space; the sternum divided and both the internal mammary arteries ligated. The azygos vein was ligated. Superior and inferior venae cavae were dissected and loops of silk passed round them. The pericardium was dissected and lifted off the roots of the great vessels. The pre-aortic pad of fat was excised and the root of the ascending aorta dissected free. A loop of silk was then placed around the aortic root.

The superior and inferior venae cavae were occluded by bull-dog clamps (this inflow occlusion was practised in all cases before bringing about cardiac arrest so as to prevent distension of the heart by the returning venous blood) The ascending aorta was clamped about one

off the cardioplegic drug from the coronary circuit. The solutions used for this purpose were either whole blood, Ringer's solution, 5 per cen glucose, normal saline or 10 per cent sodium-lactate. As soon as a definite heart beat was established the outflow and inflow clamps were removed and artificial ventilation re-started. In some instances injections of calciun [illegible] liac massage were used to [illegible] -mal rhythm. The chest

Throughout the experiment continuous E.C.G. readings were recorded. Standard limb leads and unipolar augmented limb leads were employed, lead II being the one most frequently empl[illegible]

Cooling of the dogs in cases where h[illegible]

brought about as per routine described in our procedure (A) above. The animals were taken to only a moderate degree of hypothermia in these series -- around 30°C to 32°C temperature.

The observations as made in the various phases are as follows :—

1. *Use of potassium citrate alone.*—In all 10 experiments were done. Potassium citrate solution 5 per cent to 25 per cent was used till the heart stopped. The period of diastolic arrest was from 1 to 4 minutes. The amount of potassium citrate used varied from 400 to 1200 mg. During resuscitation all the dogs went into ventricular fibrillation. In spite of all resuscitative measures such as massage, *injections of* calcium chloride, adrenalin and neostigmine none of the dogs could be revived. The temperature used varied from 30°C to 32°C. One dog died as a result of the endotracheal tube accidentally slipping out during the experiment.

2. *Use of acetyl-choline alone.*—Nine dogs were treated with Acetyl-choline 1.5 per cent solution 10 mg. per kgm. body weight In all cases a diastolic arrest not exceeding 1 minute was obtained. Eight dogs were restored to normal rhythm after washing the coronary circuit with blood. One dog went into ventricular fibrillation and could not be revived. Two of the revived animals were sacrificed on the table for other purposes; five dogs died after twenty-four hours and one after eight days. There was no evidence of brain damage in any of the animals. The experiments were conducted at 37°C temperauture.

3. *Combination of potassium citrate (1* per cent) *in different concentrations with acetyl-choline (1.5* per cent).—Five experiments were conducted with these drugs at 37°C temperature. Complete diastolic arrest varying in duration from 2 to 5 minutes was obtained in all cases. Four dogs were revived in spite of going into ventricular fibrillation while in one dog ventricular fibrillation did not revert to normal rhythm. Restitution time varied from 4 to 20 minutes. All dogs died subsequently due to brain damage.

4. *Combination of potassium citrate with acetyl-choline as in 3 but under moderate hypothermia.*—Thirteen dogs were subjected to this procedure. Dogs were cooled to a temperature of 30°C to 32°C. All went into a complete diastolic arrest of 2 to 7 minutes duration. Potassium citrate 7 to 10 mg. per kgm. body weight and acetyl-choline 10 mg. per kgm. body weight were used. During revival all dogs went into ventricular fibrillation. Eleven dogs could be revived by various restitution measures. Two dogs did not recover. The revival time varied from 1 to 20 minutes. Evidence of brain damage was definite in two animals, doubtful in two others and absent in the rest. The survival time varied from 1 to 3 days.

5. *Combination of potassium citrate with acetyl-choline under hypo-thermia as in No. 4, using 10*per cent *sodium lactate as the*

washing solution instead of blood.—Five experiments were done. Diastolic arrest of 3 minutes was obtained in all cases. Two were revived within one minute without going into ventricular fibrillation, while three animals died due to ventricular fibrillation.

6. *Combination of potassium chloride 1.2* per cent *with acetylcholine 2* per cent *under hypothermia using 10* per cent *sodium lactate as washing solution.*—Five experiments have been done so far. Diastolic arrest ranging from 3 to 5 minutes, has been obtained in all five. Of these, three recovered without going into ventricular fibrillation within 10 minutes, the other two went into ventricula fibrillation and could not be revived.

6. Investigation into the role of allergens and various other factor in the production of bronchial asthma in Rajasthan in general, an Jaipur area in particular, under Dr. R.M. Kasliwal at the S. M. S Medical College, Jaipur.

The work of the enquiry was planned for preparing a pollinatio calendar and investigating the importance of other well known inhalan allergens of this area. The pollination calendar is a record of th allergenic plants and of the time (in days and months) when they effloresce and liberate enough pollens in the atmosphere to cause respiratory allergies. Other inhalants investigated were such well known allergens as house-dust, fungi, animal dander, wool, cotton, etc. The work was planned as under :—

1. Botanical survey of the area, to identify the local trees, weeds and grasses.
2. Collection of plant pollens at the time of their efflorescence and preparation of their extracts suitable for testing.
3. Determination of allergenic pollens by performing skin tests with their extracts.
4. Study of atmospheric pollens and their correlation with the clinical history of the patients and the positive skin reactions.
5. Preparation of a pollination calendar.
6. Determination of the allergenic nature of other inhalants already mentioned.

Nos. 1 and 2 of the above work were reported in the previous years 1955-56 and 1956-57. Technics of testing and interpretation of test were also reported earlier. All the plants of this region were collected fo botanical identification. 70 trees, 19 weeds and 45 grasses were thus investigated. On perusal of botanic details it was realised that man of the plants were unimportant from the point of pollination calenday Only the anemophilous and these entomophilous plants which gror. densely or shed light pollens capable of floating in the air were considew ed. Thus 30 trees, 7 weeds and 18 grasses which fulfilled these criteir were extracted for investigation of their allergenic role. The allergen city was determined by noticing the skin reactions in cases of prove respiratory allergies. Only those reactions which could also be tallied with the history at the time of pollination of the incriminated plants were considered significant. Actually it was observed that significant reactions were given by only those pollens which were allergenic. 100 patients of asthma, 22 of hay-fever and 38 of allergic rhinitis were investigated. Of asthma 29 were perennial, 40 perennial with seasonal exacerbation and 31 were seasonal. The plants that gave significant and non-significant reactions are shown below :

Type of Plant.	Plants giving Significant reactions	Plants giving non-significant Reactions
TREES	Ailanthus, Dodonaea, Holoptelia, Morus, Parkinsonia, Phoenix, Phyllanthus, Pithecolobium, Prosopis & Putranjiva.	Acacia arabica & farnesiana, Aegle, Albizzia, Caesalpinia, Callistemon, Cassia, Cuminum Delonix, Enterolobium, Eucalyptus, Ixora, Leucaena, Lawsonia, Melia, Moringa, Nicotiana, Psidium, Raphanus and Salix.
WEEDS	Amarantus gangeticus and spinosus, Argemone, Chenopodium, Elatostema and Ricinus.	Datura
GRASSES	Chloris, Cynodon, Dactyloctenium, Desmotachya, Digitaria, Elusine, Pennisetum typhoideum, Saccharum, Sorghum halepense & Zea-mays.	Arundo, Cenchrus, Eragrostis minor & tremula, Panicum, Pennisetum dichotomum, Polypogon & Sorghum vulgare.

After having determined the significant allergenic plants of the area, the investigation was extended to determine which of the pollens actually float in the air. For this purpose a catchment slide was placed on the highest point (roof) of S.M.S. Hospital and pollens caught on it were studied. The names of the plants whose pollens were thus caught, are given below :—

TREES	Ailanthus, Dodonaea, Holoptelia, Morus alba, Phoenix, Phyllanthus, Prosopis, Putranjiva and Salvadora.
WEEDS	Amarantus-Chenopodium & Elastostema group, Cannabis, Cyperus, Ricinus.
GRASSES	The grass pollens cannot be differcutiated from each other.

On comparing pollenes found allergenic on testing and pollen caught on the slides, it was found that all important allergenic pollens were caught on the slides except Parkinsonia, Pithecolobium and Argemones. Tne grasses Dactylctenium, Digitaria and Elusine, though found allergenic on testing, produce meagre qnantity of pollens and th[illegible] much clinical importance.

From the point of view of pollination calendar the plants whose pollens were caught on the slide are really important. Other pollens which are allergenic but do not attain any concentration in the air will only cause allergy if inhaled directly. This group will also include many ornamental plants like rose, mary-gold etc. which do not constitute part of the present investigation. The pollination calendar of common and important plants, is given below.

Name of plant	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Phoenix	xx	xx	x	x	x	x						
Prosopis	x	xxx	x									
Morus			x	x	x	xxx	xx					
Ailanthus				x	xxx	xxx	x					
Salvadora				x	xxx	x						
Dodonaea					x	xxx	x					
Holoptelia						xx	xxx	xx				
Putranjiva							x	x	x			
Phyllanthus							x	x	x			
Am-Che-El group	xx	xxx	xxx	xxx	xxx	xx	x	x				x
Cyperus	xx	xx	x								x	x
Ricinus	x	x	x									x
Cannabis					xxx	xxx	xxx	xx	x	x	x	
Grasses	xxx	xxx	xxx	xx	x						xx	xxx

(x indicates aerial pollen concentration of less than 50, xx between 50-100 and xxx more than 100 per sq. cm. of the slide exposed, in month-wise distribution).

A few general conclusions may be drawn from the above table. The trees excepting Phoenix and Prosopis pollinate in and after January. Phoneix is apt to cause symptoms starting from September and lasting through February while Prosopis starts in September and ends in November. Grasses on the contrary, are apt to cause maximum symptoms during rainy season and autumn. Of the weeds, the Amarantus-Chenopodium Elastostema group begins to appear in the air from August but attains maximum concentration only during November. It is noteworthy that when this group achieves the highest concentration in air the grass pollens show a decline which fact will help in differentiating the weed allergy from grass allergy. The pollinating periods of Cyperus and Ricinus, however, coincide with those of grasses and have to be clinically differentiated and appraised. Pollens of Cannabis are most abundant in and after January and they last till after April when their concentration repidly declines.

On studying the seasonal frequeney of individual pollens it could be said that grass allergy is clinically significant during rainy season and autumn, weeds during autumn and early winter and trees during late inter and spring.

Of the other inhalant allergens, house-dust was found to be the commonest offender. It was responsible for allergic manifestations in 73 per cent of cases, either alone or in combination with other allergens. This high incidence, though reported in other countries as well, stresses the importance of house-dust in Indian evironment. Of the fungi, rusts, smuts and molds of the area were investigated. The rusts and smuts which were obtained on fiield survey were extracted and tested. Of all the patients tested only 10 gave grade I positive reaction. No significance could, however, be attached to these reactions as on further analysis of history of the disease and occupation in these patients, the reactions were found to be non-significant.

Molds cannot be obtained in pure form in nature and hence are being cultured in the laboratory. Their allergenic character is well known. The catchment slides set up in the area have been showing a high concentration of molds in the air. It is hoped that in a few months, their importance in this region will be fully investigated.

One case was found to be sensitive to wool, 4 to cotton-seed and 10 to animal danders. In the latter group 5 were sensitive to dog hair and 5 to camel hair.

The present research has been of clinical importance since it pro- [illegible] investiga- [illegible] institution [illegible] allergens, (iii) and besides, it establishes the role of other respiratory allergens that are common in this region.

7. Enquiry on the value of commercial silk grafts to bridge large blood vessel gaps under Dr. Yudhveer Sachdev at the Medical College, Amritsar.

In the year 1956 and 1957 homografts preserved in 4 per cent neutral formalin solution at room temperature, 70 per cent Ethyl alcohol, balanced salt solution containing 10 per cent homologous serum and antimicrobial drugs at a temperature 2°C to 6°C were implanted in the abdominal aorta of 30 dogs

MATERIAL AND METHOD

Silk tubes were prepared from a variety of Kashmir silk known as Tabi by sewing with sewing machine. Three types of silk tubes (double layer, single layer untreated and single layer treated) were used to bridge the gap in the abdominal aorta of the dogs below the renal arteries. Before use these tubes were finely trimmed, mounted on glass rods and sterilized either by autoclaving or boiling. The tubes were treated with blood and then fixed in alcohol. In the later series 500 c.c. 1000c.c. of 5 per cent glucose was also given by arapid drip at the end of the operation combat to shock. In 10 dogs penicillin was sprayed locally and also given par enterally in the post-operative period. Retrograde femoral ao rtography was done in 6 dogs at variable periods after the operation to visualise the condition of the prostheses. Macro and microscopic study of the prostheses removed was done in detail.

RESULTS

Silk prostheses were impladted in the abdominal aorta of 48 dogs, with following results :—

Seven dogs are still under observation with palpable femoral pulsation 216, 144, 125, 102, 83, 83 and 4 days after the operation. Retrograde femoral aortography, done in 6 of them, revealed patent prostheses.

In 8 dogs prostheses were found to be patent and suture lines normal. Femoral pulsation remained palpable in all of them till the last day. Out of these 4 were sacrificed 17, 40, 42 and 67 days after the operation. One dog was killed during fight with another dog 2 days after the operation and 2 died of haemorrhage, 13 and 15 days after the operation. In one of these the source of haemorrhage could not be traced and in the other it was due to opening of lateral seam and since then double seam is applied as a routine. One died of acute dilatation of the stomach on the 2nd post-operative day.

In 9 dogs prostheses remained patent for 2, 2, 5, 12, 19, 20, 31, 51 and 64 days after the operation, as observed clinically by palpable femoral pulsation and later thrombosis occurred.

In 6 dogs, femoral pulsation remained palpable for 4, 6, 12, 14, 37 and 45 days after the operation when they suddenly died of haemorrhage due to partial dehiscence of suture line. Prostheses in these dogs were found to be patent.

In 4 dogs partial dehiscence with thrombosis occurred 4, 2 and 69 days after the operation.

Thrombosis with paraplegia within 24 hours occurred in 8 dogs. In 4 dogs postmortem could not be done. In 2 femoral pulsat disappeared within 24 hours of the operation and in the other t remained palpable till the last day when they died 4 and 12 days aft the operation.

Two dogs absconded and femoral pulsation in these remaine patent for 18 and 21 days.

GROSS PATHOLOGY :

Out of the 48 dogs the prostheses were examined in 35 dogs. Fibrous tube was formed around 10 prostheses. This tube was formed during the second week and was loosely adherent except near the suture lines. Luminal surface of the prostheses was covered by fibrin layer in 12 dogs. It was about 1 mm. thick and resembled intima of the host aorta in prostheses removed 6-7 weeks after the operation. There was no inner lining in prostheses in which early or late thrombosis occurred. It was loosely adherent except near the suture lines.

HISTOPATHOLOGY :

Histopathological examination was done in 28 prostheses which revealed that the inner fibrin lining was gradually replaced by fibrous tissue starting near the suture lines. Outer tube contained fibrous tissue, chronic inflammatory cells and foreign body gaint cells. No fibrous tissue was found growing through the interstices.

8. Study of renal changes following ureteric ligation and an assessment of recovery following release of obstruction by ureteric transplantation under Dr. B. N. Balkrishna Rao at the G. R. Medical College, Gwalior.

From the work conducted on this enquiry in the last three years, the following conclusions have been drawn :—

(i) Sudden complete obstruction to the ureter invariably produces hydronephrosis and not primary renal atrophy as is usually believed.

(ii) By study of retrograde pyelograms, dye excretion tests (Indigocarmine and P. S. P. tests), blood urea and histopathology, it has been concluded that critical time period for reversal of hydronephrotic changes is 21 days.

(iii) The higher the obstruction in the ureter the quicker hydronephrosis develops and more the renal damage.

(iv) Incomplete obstruction to the ureter also invariably produces hydronephrosis. This hydronephrosis is much slower to develop and produces lesser damage to renal tissue then that of hydronephrosis by complete obstruction.

The aim of the present scheme is to elucidate the effects of gradual, incomplete obstruction, to determine the etiology of the so called idiopathic hydronephrosis and to investigate certain other factors concerned with experimental hydronephrosis, for example, the study of the rate of growth of stone in hydronephrosis sac or urinary bladder and the study of changes in lymphatic pattern.

The changes in back pressure irrespective of the nature of primary obstruction are of importance due to the ultimate effect they have on the kidney. Discussion on this subject has long interested physiologists, pathologists, as well as surgeons and urologists. The results of the present work differ fundamentally from previously published reports, especially on restitution to normal of hydronephrotic kidney. In the present work, contralateral nephrectomy carried out to exclude the effect of renal counterbalance still led to functional recovery.

This was conclusive evidence of the recovery of the kidney which was formerly hydronephrotic.

The knowledge gained through experimental work so far, has the following important therapeutic applications :—

(i) Conservative treatment of ureteral obstructions may be followed without any increased risk for a much longer period than is at present practised.

(ii) Nephrectomy need not be carried out so frequently in cases of obstructive hydronephrosis. It should only be performed if, after removal of obstruction to allow the renal parenchyma optimun facilities for recovery, there has not been the expected progress.

9. Inquiry into experimental production of pneumoconiosis an emphysema under Dr. R. K. Goyal at the S. M.S. Medical College Jaipur.

The work reported till the end of September 1957 had shown that monkeys and dogs are very susceptible to pneumoconiosis, sheep and goats are less susceptible, whereas rats, rabbits and guinea-pigs are rather resistant. The susceptibility of pigs and cats was next investigated. Five pigs and fifteen cats in all were examined for this purpose.

The results indicated that cats and pigs are not highly susceptible to pneumoconiosis. The presence of co-existing infection appears to be necessary for the production of early pneumoconiosis in these animals.

In the present series of experiments the effects of added infection were investigated. As many as 72 rats were exposed to a mixture of dust (3 parts) and wood-charcoal (1 part). This mixture is preferred to simulate the condition to which the urban populations are usually exposed. Since the organisms isolated from the lungs of rats suffering from acute bronchiolitis or interstitial pneumonitis were usually *B. coli* (and only occasionally staphylococci), cultures of the former orgasisms only were used in infecting the animals in this experiment. Suitable controls were also maintained. The results are given below.

The rats were made to inhale dust and charcoal for periods varying from 23 to 52 days; sub-lethal doses of *B. coli* (200-300 million) were injected intraperitoneally either (a) about one month before the inhalation or (b) during the period of inhalation. The injection of *B. coli* one month before the inhalation, did not have any effect on the lesions The lesions of early pneumoconiosis with presence of coal particles and scanty silica particles were less marked in those rats who had received *B. coli* injection during the course of inhalation *B. coli* injection produced acute interstitial pneumonitis which probably helped in the mobilization of the few carbon or silica particles already present in the lung tissue. The intraperitoneal injection of *B. coli* or a mixture of *B. coli* and Staphylococci led to the appearance of extensive peribronchial foci of lymphocytic infiltrations. These lesions resembled those produced in rats exposed to inhalation of dust, hence the lesions in the lungs of rats may be considered to be mostly non-specific. A few silica particles along with the granulomations lesions were encountered only when chronic inflammatory lesion co-existed. These chronic inflammatory lesions could not be reproduced by injection of *B. coli* or staphylococci. was, therefare, considered desirable to use an avian strain of tubercle bacilli to produce chronic inflammatory lesions, such a virulent strain however, could not be easily obtained. A suspension of rat leproma bacillus was obtained instead from the School of Tropical Medicine, Calcutta and the effects of its injection were investigated.

The rat leproma suspension was injected into the lung of four rats. preliminary experiment, a rat was exposed to dust and charcoal ation for 28 days after about four weeks of the intrapulmonary injection of the suspension, small amounts of silica along with carbon par were discernible in a few small foci. It would thus appea c inflammatory lesions produce chronic lympha ention of carbon and silica particles.

The above-mentioned experiments were repeated with certai modifications/using guinea-pigs. The inhalation of a mixture of dust an charcoal carried out for 16 to 38 days produced foci of lymphocyti infiltration as well as marked narrowing of some arterioles; coal an silica particles were encountered in moderate amounts when there wa co-existing subacute bronchiolitis. Attempts to produce chronic bron chiolitis and lymphangitis with the B. C. G. strain of bacillus provec unsuccessful.

In the next series of experiments, 100 tubercle bacilli (virulent human strain) were injected intraperitoneally into guinea-pigs, which were then made to inhale dust and carbon mixture at varying intervals. The guinea-pigs, which developed early tubercular lesions 4-5 weeks after infection showed the presence of silica and carbon particles in moderate amounts, whereas the uninfected controls showed presence of silica only very scantily. The infected guinea-pigs which did not develop early tubercular lesions at this stage did not show any accumulation of silica particles. It is thus clear that chronic inflammatory lesions causing probably obstruction to the lymph flow are responsible for early pneumoconiosis in guinea-pigs.

The experiments were repeated using 21 rabbits this time, of which four died prematurely.

The rabbits exposed to a mixture of dust and charcoal in the inhalation chamber for 24-38 days developed definite interstitial pneumonitis and in a few instances, the vessel walls were markedly thickened, but the silica particles were either absent or were very scanty. A number of rabbits were injected, each with 10 million tubercle bacilli by the intravenous route and were made to inhale mixture of dust and charcoal for varying periods along with uninfected controls. They were sacrificed from 14 days onwards. Silica particles were in evidence in moderate amounts in rabbits showing tubercular lesions, whereas the uninfected controls had only very scanty amounts of silica excepting in one case where the uninfected rabbit developed bronchiolitis. Thus, it again became evident that the presence of chronic inflammatory lesions is required for the production of early pneumoconiosis in rabbits.

Twenty monkeys were made to inhale a mixture of dust and charcoal for periods varying from 15 to 56 days. Three monkeys were given, in addition, sublethal doses of *B. coli* by the intravenous route, the carbon and dust particles were mobilized due to the acute infection and the lesions of pneumoconiosis were consequently less severe than in the controls. Six of the monkeys which were in apparently good health, became ill and showed definite tubercular lesions on post-mortem examination when they were made to inhale dust and carbon mixture for 13 to 20 days. It would appear that pre-existing tubercular lesions were markedly aggravated by the inhalation of dust and charcoal.

Most of the monkeys, especially the older ones showed varying degrees of thickness of some of the arteriolar walls in the lungs. The thickening was generally of the nature of medial hypertrophy with degenerative changes, the lesions of endarteritis obliterans being infrequent. The medial hypertrophy indicated the existence of pulmonary

hypertension, which might lead eventually to cor pulmonale. No evidence of advanced heart failure was seen in the experimental animals.

Further work is required to elucidate the fact whether this benign pneumoconiosis does really cause an increased susceptibility to infective lung diseases.

10. Inquiry on bio-microsocopic study of the conjunctival vessels in relation to the general arteriosclerosis and coronary artery disease under Dr. K.N. Mathur, Dr. K.S. Mathur and Dr. P.N. Wahi at the Medical College, Agra.

Abstract of the work done during the year 1958.—In the year 1958, 35 cases of essential hypertension and 20 cases of coronary heart disease were examined and the elasticity of the conjunctival vessels was determined by the same old technique which was perfected in the past years and in which priscol, a vasodilator drug, was used.

Fifty normal cases were also examined during this year by a new technique in which a vasoconstrictor drug like adrenaline hydrochloride was used in place of priscol for finding out the elasticity of conjunctival vessels.

Results of the Hypertensive cases examined with Priscol.—Blood vessels of diameters of .1, to .2 mm. were observed in all the hypertensive cases, while vessels of .3mm. diameter were seen in only 32 per cent cases. In the remaining 68 per cent it was not possible to demonstrate vessels of .3 mm. diameter. These later cases belonged to the older age group.

A change from the normal was also observed in the pattern of the conjunctival vessels in hypertension. Tortuesity, loops, sharp bends, irregularity of the lumen of the vessels and aneurysms were common in these cases.

Along with the changes in the pattern of the conjunctival vessels in hypertension, a diminution in their elasticity was also observed. It was seen that the conjunctival vessels did not dialate to the same extent with priscol as observed in the normal individuals of the same age group. When compared with the normals of the same age group, it was also observed that the vessels showed a delay in the onset of dilatation, and an increase, in the duration of maximum dilatation and the time taken by them to return back to their original diameter..

All cases of hypertension with the above findings in the conjunctival vessels showed sclerotic changes as well as loss in elasticity of the vessel wall.

Results with Adrenaline hydrochloride.—In spite of very satisfactory results obtained by the use of priscol, one great inconvenience was felt. The priscol test was found to be very much tiring to the patient as it took nearly 1½ to 2 hours or even more to complete the examination. This necessitated exploration for some other drug which when used would help to shorter the duration of the test. Adrenaline hydrochloride being a short acting drug, was ultimately choosen.

To start with, 50 normal subjects were examined with different dilutions of adrenaline hydrochlorde to find out if there is a variation in the threshold in different age groups. This being not so, it is now decided to use 1: 1000 dilution of adrenative hydrochlorde for all the age groups. The investigations are in progress.

11. Inquiry on biochemical studies on tumor under Dr. S.C. Roy, Department of Applied Chemistry, Calcutta University, Calcutta.

Biochemical.—Ten different samples of blood plasma from patients under the hospital condition have been analysed with respect to free and protein amine acids by the paper chromatographic technique.

The lipid content of whole blood from both the normal and the leucoderma patient was studied. The total lipid was further fractionated into phospholipids (lecithin, cephalin), cholesterol. The significance of these data will be assessed after an adequate number is studied.

Clinical.—Majority of cases coming for leucoderma (Vitiligo) show some sort of gastro-intestinal disorder and clinical investigation [illegible] intestinal infection by one or more of [illegible] than bacteria). [illegible] grouped into :—

A. Cases with definite colitis having specific pathogenic intestinal infection.

B. Cases with no clinical manifestation of colitis.

Other precipitating factors associated with the appearance of the lesion are trauma, application of some sort of cosmetics etc.

Response depends on the treatment of specific infection, type of lesion, duration and finally on the local pigment stimulating applications.

Muco-cutaneous and cosmetic types and late cases do not reveal satisfactory response.

[illegible] horter durati[illegible]

A [illegible] the role of specific treatment, nutrients, high protein, essential amine acids and hepatic tonics etc., will be assessed at the conclusion of the experiment.

Group.	Total number of cases.	Response.		
		Complete	Partial or satisfactory	Poor.
A	15	2	9	4
B	7	–	5	2

12. Enquiry on synthetic media of tissue culture and the measurement of proliferation of cells under Dr. C. V. Ramakrishnan at the Faculty of Science, Baroda University, Baroda.

The project on tissue culture was started in this laboratory with the following objects:—

(i) To standardise methods for the measurement of uptake of nutrients by a growing tissue speck. (ii) To standardise methods for measuring tissue proliferation. (iii) To study the enzyme systems active in the tissue and their change with growth or deterioration. (iv) To differentiate proliferating surviving and deteriorating tissues with the help of nutritional and biochemical data and to differentiate tissues which can not as yet be differentiated on a histochemical basis.

It has been possible to achieve standardization of the conditions for growing chick embryonic tissues directly on glass in roller tubes in a purely synthetic medium.

Micromethods have been standardised for the estimation during the proliferation of the tissue speck in synthetic medium, of sugar uptake, (Gothoskar, Ratnam and Ramakrishnan, Clinica Chimica Acta, 1995), increase in tissue protein (Gothoskar, Ratnam and Ramakrishnan, Natur wissenchaften, 1958), and amino acid uptake (Gathoskar, Raina and Ramakrishnan, communicated)

Micromethod for the estimation of respiration and enzyme activity in the proliferating tissues, with special reference to the Kreb cycle enzymes have also been worked out.

(Gothoskar, Raina and Ramakrishnan, paper under preparation).

It is found that the ratio of change in tissue protein to change in sugar content of the medium yields a measure that enables us to differentiate proliferating, surviving and decaying tissues from one another (Gothoskar, Ratnam and Ramakrishnan, Ind. Jour. Med. Res. 1958; Gothoskar, Ratnam and Ramakrishnan, Experimental cell Res. 1958). Preliminary investigations carried out show that chick tissue does not need glutamine, whereas rat and human tissue are known to need glutamine (Gothoskar, Ratnam and Ramakrishnan. Ind. Jour. Med. Res. 1958). This observation derives additional reinforcement from the high content of glutamine synthetase enzyme in chick tissue and low content of the same in rat tissue. It is also found that the ratio of protein synthesis to sugar uptake differs in various media. (Gothoskar, Ratnam and Ramakrishnan, Ind. Jaur. Med. Res. 1958). These findings underline the need for obtaining precise biochemical data on various normal tissues and for working out standard conditions for their growth in synthetic media.

13. Clinical study of neuropathies under Dr. P. N. Chuttani at the Medical College, Amritsar.

A total of 261 cases of various types of neuropathies [illegible] were studied [illegible] 251 cases [illegible] long enough [illegible] ssion. The main aetiological or clinical groups met with were diabetic neuropathy in 86 patients, arsenical neuropathy in 23, Landry-Guillain-Barre syndrome in 24, subacute combined degeneration in 18, meralgia paraesthetica in 21, shoulder girdle syndrome in 7, nutritional neuropathy in 14, and the "idiopathic" variety in 20. A large number of other varieties [illegible] 3), typhoid (3), [illegible] neumonia (1), [illegible] ogenic carci- [illegible] hyperemesis [illegible] ial polyneuri- [illegible] teritis nodo- [illegible]

Apart from routine laboratory investigations, nerve biopsies from digital nerves of the involved limbs [illegible] examination conducted after staining [illegible] H. & E., Van Geison, osmic acid or myelin stain, azocarmine or P.A.S. and of frozen sections with silver stain. Frozen sections were also studied under polarised light. Changes such as increased cellularity, thickening of perineurium and/or endoneurium, increase of fibrous tissue, fragmentation, granularity, ballooning and absence of myelin and swelling, fragmentation, diminution or absence of axons were seen in various combinations. No specific histopathological picture emerged for any particular aetiological variety and there was no obvious correlation between the severity of histological change and the clinical condition. However, pathological changes were the rule when neuropathy was well developed. Seventyfive cases reported for one or more follow-up examinations. Serial nerve biopsies were done in twenty patients at intervals, longer than two months. While in five instances repeat biopsies showed severer changes, improvement was noticed in three ; others showed no appreciable change.

14. Inquiry entitled 'Relative value of rest and movement in the treatment of intra-articular fractures-an experimental study' under Dr. B. Mukopadhya at the P.W. Medical College, Patna.

During the current year experiments were limited only to the knee joint. It was decided to produce damage to individual structures of the joint, as for example, the articular cartilage, the cancellous bone, the synovial membrane, etc. and then to study the effect of each of these injuries on the structure and function of the joint. With these objectives, the damage was limited to the articular cartilage in the first series of experiments, and in the second series only a linear transverse fracture of the patella was produced without damaging its tendon. Following the injury one series of animals was immobilized in plaster while the other series was not so immobilized. The function of the joint was assessed accurately every day and the results noted. After sacrificing the animals at fixed intervals from the date of operation, a complete and thorough examination of the damaged joint was carried out. Photographs were taken at the time of sacrifice and careful histological examination was made of all layers of tissues.

The following conclusions were drawn :—

(1) The articular cartilage when damaged by intrarticular fractures, undergoes a distinctive type of repair. The area denuded of articular cartilage is covered by an exudate in which there is proliferation of fibrous tissue cells. Study of the material at different intervals from the date of injury indicates that this exudate which fills up the denuded area is gradually invaded by a type of granulation tissue. The deeper parts of this granulation tissue which lie in contact with the subjacent bone undergo a process of gradual replacement by fibro-cartilagenous cells. These cells are probably derived by cell metaplasia in exposed bony trabucale. The marrow in this area undergoes considerable proliferation with the presence of a large number of newly formed blood vessels. Gradually the whole area of denuded cartilage comes filled up with fibro-cartilagenous tissue. The thickness of this fibro-cartilage is not uniform nor are the cells arranged in any regular pattern. At the margins of the denuded area of the articular cartilage the repair may not be as advanced as in the central portions. Gradually, the superficial layers of this fibro-cartilage become flattened and the surface layer comes to resemble the surface layer of normal hyaline cartilage. As time goes on further changes can be noticed. These consists of gradual transformation of the fibro-cartilage into hyaline cartilage in the superficial portion. The deeper portions undergo gradual ossification, the process of these changes being a direct transformation of fibrous tissue elements into bony tissue. Ultimately at the end of 18 weeks, which is the longest period for which these animals have been observed, the damaged area of the articular cartilage is covered by tissue which very cosely resembles normal hyaline cartilage. So far as has been observed, it has not been possible to detect any difference in the nature and type of repair between the animal which had post-operative immobilization and those which did not have such treatment.

Interesting as the changes in the denuded area of the articular cartilage are, the changes which occur in the articular cartilage of the con-

dyle of the femur, over which the damaged area of the patellary surface plays during movements of the knee joints, are even more interesting. The changes in this area may be summarised as of two types.—

(a) The more frequent changes consist of degeneration, vacuolation, hyalinization and destruction of the articular cartilage cells. The superficial layers of the articular cartilage are shed off and the cartilage becomes thinned so that in certain areas the subchondral bone may become exposed. In this degenerated portion of the cartilage there is evidence of fibrosis and also formation of fibro-cartilagenous cells. The subchondral bone also shows definite changes. The predominant picture is that of suppression of the normal articular cartilage. The cells lose their regular columner arrangement and their normal pattern is disturbed.

(b) In a smaller proportion of cases, although there is some degeneration and vacuolation of the articular cartilage cells the predominant picture is that of proliferation so that the surface layer of cells is considerably thickened. However, even in these cases there is disturbance in the smooth lining of the surface layers.

(2) In the series of experiments in which a simple linear fracture through the whole thickness of the patella was created, with or without subsequent immobilization, the following changes were noted :—

Microscopically :

(a) There was some evidence of fibrosis in the synovial membrane.

(b) There was definite evidence of a rusty pigmentation of the synovial tissues.

(c) The fracture line in the articular cartilage could be detected even at the end of 12 weeks—the longest period for which these animals were observed.

(d) No evidence of the line of fracture could be detected in the bone even at three weeks after the experiment.

Microscopically, the changes are very interesting. In all animals r observed, the bone had healed completely so that no evidence of racture line could be detected in any section taken three weeks the operation. The articular cartilage, however, showed presence it like gap in every case except one. The margins of the slit mooth and lined by cells resembling the cells of the surface layer articular cartilage. At the deepest part of the slit where the ge joins bone, there was evidence of fibrous proliferation and the abeculae adjacent to this area showed definite evidence of osteoctivity. Only in one case the area of damage in the cartilage d up with fibrous tissue. The articular surface of ... fe ninimal changes. The histological appearances y between the two groups of the cases.

In the group of animals in which pure articular-cartilage-damage was produced, the function in the limb returned in an average period of 8 to 9 days from the date of the operation if no immobilization was instituted. In the group of animals where the operation was followed by a period of three weeks immobilization in plaster, full function returned on an average about 14 to 15 days following the removal of the plaster. Thus, the total period of disability in this series amounted to an average of five weeks instead of 9 days as in the non-immobilized group. Exactly the same results were obtained in the group of animals in which a transverse fracture of patella was produced. Thus, it will be seen that where the articular damage is minimal restoration of function is complete whatever the method of treatment adopted. This is in accordance with the results of our previous experiments. The only advantage obtained by not immobilizing the limb was that complete functional restoration was achieved in a shorter period of time. Histological studies also indicated that the nature of tissue repair in groups immobilised and not immobilised are similar and no difference could be found in the local tissue changes. Further experiments with more severe types of injury to the joints are in progress.

15. Experimental study of the role of adrenal cortex in the genesis of congenital abnormalities under Dr. I. P. Agarwal at the G. R. Medical College, Gwalior.

The experimental study was carried out on two different breeds of fowls i.e., Rhode Island Red (R.I.R.) and white leg-horn (W.L.H.) in order to evaluate the effect of genetic constitution in relation to the role of adrenal cortex in the genesis of congenital abnormalities. The chick embroys of R.I.R. showed a high incidence of spontaneous early deaths and congenital abnormalities (29 per cent and 19.8 per cent respectively), while the chicken of pure breed W.L.H. fowls showed 11.5 per cent spontaneous deaths and 2.2 per cent congenital abnormalities. The former probably had an inherent weaker genetic background.

The main conclusions of the present study are as follows :

A. *Action of cortisone acetate on embryonic tissues of the chick* (Injection of 0.0048, 0.0032 and 0.0016 mg. per egg into the albumin of egg)—

(i) Cortisone acetate even in such minute doses exerted a very marked lethal action on embryonic tissues of the chick. This action is independent of genetic constitution of the two breeds.

(ii) Cortisone acetate exerted teratogenic action only in R. I. R. which had a defective genetic background as evidenced by a high incidence of spontaneous congenital abnormalities. In pure breed W. L. H. which showed few congenital abnormalities, cortisone failed to manifest any teratogenic action. *Therefore, it will be more logical to state that cortisone potentiates the expression of inherent genetic weakness.* This is in confirmity with the observations of Fraser, Fainstat and Kalter who observed increased incidence of cleft palate after cortisone in a strain of mice genetically susceptible to this condition. This can also explain the failure of many workers to demonstrate any teratogenic action of cortisone acetate in chicks, rats and mice while others observed the potentiating action of cortisone acetate on spontaneous abnormalities in mice, insulin induced bnormalities in chick embryos and hyper-vitaminosis A indu ad abnormalities in rats.

rther investigations into the anti-teratogenic action of cortisone ace
:.

jection of cortisone acetate into mother hens of W. L. H. breed, produce any effect on egg laying capacity, fertility, sponta- ly deaths of chick embryos but on the other hand, eliminated l abnormalities. Since this breed has not got a very low inci- per cent) of spontaneous congenital abnormalities it is not evaluate the exact significance of this observation. However, s further importance in view of the obs... t cortisone acetate has been successful in el... action of trypan blue on rat embryos.

C. *Comparative study of congenital abnormalities induced by cortisone, insulin and eserine sulphate.*

It appears that teratogenic effect af insulin is also partially dependent upon the inherent genetic weakness of individual breed. This qualitative similarity of insulin and cortisone (both being internal secretions) requires further study.

D The histological examination of adrenal gland in controls and cortisone treated chick embryos did not show any change in morphology and distribution of sudanophilic material.

E. Vitamin C has also been estimated in allantoic fluid of chick embryos in control series of both the breeds.

16. Investigations into the epidemiological factors of rheumatic heart disease under Dr. Devi Chand, and antistreptolysin titres in children under Dr. S.L. Bhatia at the Lady Hardinge Medical College, New Delhi.

uuy was originally started in the Hills
iring the first year the incidence and
in the Himalayan Hills were studied
year the enquiry was continued at
Delhi, and besides studying the epidemiological factors in the plains,
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the i... chanisms
and ... rheuma-
tic ... heumatic
patie... A study of streptococci from throat cultures was carried out
is being specially runstudies were also undertaken A rheumatic clinic
and C-reactive protein for this project at the Irwin Hospital New Delhi.

Bacteriological work connected with the enquiry was carried out by Dr. S. L. Bhatia, Professor of Bacteriology, Lady Hardinge Medical College, New Delhi.

So far 162 patients of rheumatic fever and rheumatic heart disease were studied in Delhi. Of these 130 were proved cases of rheumatic disease and 32 were doubtful cases. The antistreptolysin O titres were done in all of them. However, detailed clinical analysis could be made only in 115 of the 130 proved cases. The results are given below:—

Clinical.—There were 70 males and 45 females. Two were under 5 years of age, sixty-eight between 6 and 20 years, forty-four between 20 and 40 and six above 40 years of age. Eleven cases presented themselves in the classical phase, 99 in the phase of protracted carditis and 5 in the quiescent phase. Among cases of protracted carditis 62 had active rheumatic process at the time examination, and of these 54 were in congestive heart failure. History of classical attack could be elicited in only 53 *per cent* of the cases while in the rest the onset was either with low grade symptoms or the lesions were discovered accidentally on routine physical examination. Whatever the mode of onset, more than 70 per cent of the cases had their first symptoms between 6 and 20 years. An antecedent history revealing the association of trigger ... drome could
be elic... cases who
had th... t of 30 cases
of this type a history of sore-throat and upper respitatory infection could be obtained only in 8 cases. The other precipitating factors elicited were: bacterial infections—2 cases; fever of undefined nature—5 cases; exposure, fatigue, exhaustion and chill-6 cases; physical trauma—3 cases; pregnancy ... psychic stress—3 cases. This
emphasises ... trigger mech... play in
exciting th...

Regarding clinical mainfestations, the majority of cases had arthralgias and 11 had actual arthritis. Eight cases had chorea. No case with subcutaneous nodules or erythema marginatum was seen. All cases showed evidence of carditis. Significant apical murmurs were present in 111 cases. The incidence of valvular involvement was as follows:-

Mitral stenosis, 18; mitral incompetence, 30; mitral stenosis and and incompetence, 48; aortic stenosis, 5; aortic stenosis and incompetence, 2; pure aortic incompetence, 1 and combinations of mitral and aortic lesions, 10 cases. One case had tricuspid regurgitation.

Bacteriological.—The normal antistreptolysin titre was 200 units as indicated by results on a majority of controls. All cases in the classical phase had a titre above 400 units, most of them showing a titre above 1000. Amongst cases with protracted carditis showing signs of activity, eleven showed a titre of less than 200, another eleven between 200-400, four between 400-1000 while in one case it was above 1000. In cases of protracted carditis without rheumatic activity seven showed a titre of below 200, three between 200-400, 9 between 400-1000 and two above 1000. In the absence of rheumatic activity in this group, the high titres observed seem to be contrary to expectations. Among the controls, the majority showed titres below 200 units, fourteen between 200-400, two between 400-1000 and in two cases the titre was above 1000. Investigations which are in progress on the lines indicated above will throw further light on the epidemiological and clinical aspects of the problems.

17. Comparative study of serological techniques in detecting antibodies following immunization with S. Typhi O antigen in rabbits and in sera of patients suffering from enteric fevers under Dr. A.K. Banerjee at the S.S.K. Memorial Hospital, Calcutta.

S. typhi (0.901) collindale strain has been used in this investigation. The O antigen of the intact bacteria and the isolated soluble polysaccharide fraction of the O antigen complex, have been studied. The studies on the polysaccharide fraction also included quantitative chemical analysis and estimation of its sugar. The serological studies included qualitative bacterial agglutination, polysaccharide haemagglutination, immune-haemolysis and their specific inhibition by the polysaccharide heptene.

The organism has been adapted to grow in a synthetic medium. Work is in progress to study the serological behaviour of antibodies following immunization with antigen (S. typhi-O) containing known amounts of bacterial nitrogen, lipid, polysaccharide and an appropriate mixture of them. Serological techniques in saline and macro-molecular media are being used in the study of both rabbit and human sera.

18. Enquiry on the early diagnosis of enteric fevers under Dr. N.P. Gupta at the K. G. Medical College, Lucknow.

Laboratory diagnosis of enteric fever requires 48–72 hours with the available procedures like blood culture, Widal test, stool culture, etc. It is even more difficult in early stages of disease when only blood culture is said to be positive. With the rapid advance in the treatment of enteric fever, it has become necessary to discover techniques to diagnose these cases early and quickly. It was proposed to investigate if a soluble antigen could be detected in blood and/or urine in early stages of this disease in human beings and in experimental mouse typhoid.

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Eight patients with a positive blood culture on admission, were studied and their urine was examined for a number of days for soluble antigens. Haemagglutination inhibition was observed in the urine of 5 out of 8 cases of enteric fever investigated. This inhibition was observed in the second week of the disease in all the 5 cases and sometimes even after the agglutinins appeared in the blood.

Haemagglutination inhibition test was positive with the serum of two out of 16 cases of enteric fever with positive blood culture. In these cases complete inhibition of haemagglutination was observed.

The bacteriophage inhibition test was carried out by noting a reduction in the number of plaques obtained with a standard V phage A, which had been incubated with urine or serum. *Parallel titration of* original phage was also carried out. This test was done with urine of 8 cases and serum of 7 cases of enteric fever. No reduction was seen in the number of plaques. It was concluded that the Vi antigens or haptens were probably not present in the urine or serum in a soluble form.

present, but it was not possible to demonstrate the presence of soluble antigen by this method.

(ii) Observations were also made on experimentally produced mouse typhoid with S. typhi-murium. Four sets of experiments were done. Two sets of 50 mice each were infected by intraperitoneal injections of S. typhi murium, another 2 sets of 100 mice each were infected by oral feeding with the same organism. Mice were kept in metabolic cages, and haemagglutination inhibition test was done with the urine and faecal extract of mice in all the 4 sets throughout the course of the disease. During the course of disease in all the experiments, phases of bacteraemia were recorded by repeated bacterial counts in the blood of infected mice.

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results. Haemagglutination inhibition test with serum of inf
also did not show any positive results.

19. Investigation into the problem of chronic splenomegaly and its relation to hepaticpathology under Dr. B. K. Aikat and Dr. A. K. Basu at the S.S.K.M. Hospital, Calcutta.

The object of this enquiry was to study the (a) the association of chronic splenomegaly with hepatic pathology and (b) the effect of splenomegaly on the structural and functional status of the liver.

The study included:

A. 1. Investigation of cases where splenomegaly was one of the outstanding features to establish the *cause or causes of such splenomegaly*. Investigations into the functional and structural status of the liver in such cases.

2. A study of selected cases on whom splenectomy was performed with or without an appropriate shunt operation-

3. A longitudinal study of such cases involving assesment of the clinical, haematological and the structural and functional status of the liver was undertaken during the post-operative follow-up period.

B. Experimental production of hepatic damage with or without gross splenomegaly and study the effect of (i) splenomegaly on the evolution of the hepatic lesion and (ii) splenectomy on the evolution of experimental cirrhosis, performed at various stages.

Results of the Clinico-pathological study:

Analysis of 75 cases of Splenomegly.

Aetiolo ical classification.		*No. of cases.*
1- Primary Liver Disease:		
(a) Post necrotic cirrhosis	..	26
(b) Diffus Hepatic Fibrosis	..	12
(c) Postnecrotic scarring	..	3
(d) Late stages of cirrhosis anatomically unclassified	..	11
		52

2. Extrahepatic Obstruction	..	13
3. Thalassaemia E. Disease	..	3
4. Chronic Malaria	..	3
5. Kala-azar ..	..	2
6. Polycythaemia Vera	..	1
7. Primary Splenic Tumour	..	1
		75

After assessing the functional status splenectomy, with or without splenorenal shunt was performed in the following groups :—

	Splenectomy with shunt	Splenectomy alone
Post necrotic cirrhosis ..	7	11
Diff. Hepatic Fibrosis ..	4	5
Post necrotic scarring ..	3	0
Ext. Hep. Obstruction ..	4	8
Primary R.E. Hyperplasia	0	4
Total	18	28

The subsequent assessment has been done as a longitudinal study during the follow-up period of 3 years.

Conclusions from the Clinico-pathological data.

1. In every case of splenomegaly the cause could be established. It appears that there is very little justification in recognising any further, the term, "Tropical Splenomegaly".

2. Hepatic pathology constituted the commonest aetiological factor. Post-necrotic cirrhosis and scarring formed the largest single group.

3. No linear relationship was detected between the extent of portal pressure, ascites, haemmorhagic episodes and the size of the spleen.

4. The largest spleens were seen in the post-necrotic cirrhosis and scarring group as also in primary R.E. cell hyperplasia of the spleen. Histologically, cellular hyperplasia was the most common feature in splenomegaly associated with liver disease. The size of the spleen was comparatively smaller in the extra-hepatic obstruction group where the classical picture of fibrocongestive splenomegaly was seen.

5. Haemmorhagic episodes were the most frequent symptoms in the extra-hepatic obstruction group in whom absence of ascites, however, was the outstanding feature.

6. A hypersplenic factor was observed in all cases and in almost every case there was improvement of the haematological status after removal of the spleen.

7. Although the number of operated cases with reas

cases splenectomy with shunt has given the most encouraging results in all the studied groups. Splenectomy alone appears to be less effective and carried a higher mortality rate during the subsequent follow-up period. In the primary liver diseases group, the results were most satisfactory in post-necrotic scarring. Comparatively, the post-necrotic cirrhosis group have shown better posts-operative results than cases with diffuse hepatic fibrosis.

8. One of the important complications during the post-operative period was infectious hepatitis confined only to the post-necrotic cirrhosis and scarring group. The cause of this selective incidence may be of significance although can only be a matter for speculation at this stage.

9. Pathology of the spleen:—Contrary to the existing concepts, a marked difference was observed between the pathology of the spleen complicating liver disease and those due purely to mechanical obstruction due to extra-hepatic obstruction. While the classical picture of fibrocongestive splenomegaly was observed in the later group, reticuloendothelial hyperplasia was the most prominent feature in cases with cirrhosis. Such cellular hyperplasia could be well compared with primary R.E. cell hyperplasia associated with conditions, like Kala-azar, Malaria or Thalassaemia E. disease. The congestive features were very much less marked both in extent and in distribution. Similar congestive features were also seen in Primary R.E. hyperplasia of the spleen.

Experimental Study :

A pilot study was first carried out to produce signficant degree of splenomegaly by intra-peritoneal injections of a macromolecular substance, methylcellulose with a viscosity grade of 400 centipoises. It was possible to produce gross splenomegaly by giving 30 injections of 1 c.c. of 2.5 per cent methyl cellulose intra-peritoneally twice a week.

Liver injury is being produced by 30 biweekly injections of carbon tetrachloride of 0.1 c.c. per 100 g. of body weight in adult albino rats.

Experimental groups under investigation :

Group A	Ccl_4 with Bal. diet	Ccl_4 with 2 per cect prot. diet.	Ccl_4+Meth. Cell.+ Bal. Diet.	Meth. Cell+ Bal. Diet.
Group B	Splenectomy in each of the above groups after 30 injections.			
Group C	Primary splenectomy followed by the procedures in Group A.			

The structural and functional status of the liver is being evaluated in each group along with biochemical estimations of the liver tissue.

20. Inquiry into electrophoretic study of immunised rebbits with particular reference to immunological tolerance under Dr. D. Barua at S.S.K.M. Hospital, Calcutta.

The object of this part of the study was to see whether acquired immunological tolerance could be established in rabbits with bacterial antigens and to see whether such tolerance could be correlated with the synthesis of gamma globulin by baby-rabbits.

Rabbits of unselected breed were mated in the laboratory and their offsprings were used for the experiments. A heat-killed suspension of localy isolated strain of *S. typhi* was used throughout the experiments for immunisation. For agglutination reaction the 'H' & 'O' suspensions were prepared from standard strains of *S. typhi* obtained from NTCC, Colindale. The sensitivity of each of the suspensions were tested with standard were before being used for the tests.

Six adults rabbits which were free from antibodies against *S. typhi* ... Four weeks ... was found ...

Only 10 baby-rabbits born of 4 mothers free from antibodies against *S. typhi* survived the experiments which is associated with high mortality rate. One out of each of 4 litters was kept as control and remaining 6 were immunised with 0 2 c.c. of the antigen containing about 50x106 organism injected intramuscularly within 4-16 hours of birth. Two and four weeks after immunisation, the sera of the control and test animals were found to contain no demonstrable antibody.

These ten animals were challanged again with the same antigen when they are about 16 weeks old as in case of the adult control animals.

Four weeks later the titre of the sera of the control baby rabbits was found to vary between 1:160 and 1:1280 and that of the test animals from 0 and 1:160.

Eight pregnant rabbits, free from antibody against *S. typhi* were opened up on the 25th and 30th days of gestation and the embroys in utero were injected Im with 0.2 c.c. of the antigen containing about 50 x 106 organisms. Only 3 baby-rabbits of 3 litters which were immunised ... Two and four weeks ... sera. They were ... n injection of the ... Four weeks later the titre was found to vary between 0 and 1:80.

These experiments tend to show that partial immunological tolerance could be established in rebbits with *S. typhi* antigen.

Electrophoretic study of the sera of new-born rabbits revealed re- sence of gamma-globulin in their sera in varing amoun hich borrowed gamma- globulin from their mothers. So inv line was given up.

22. Studies on the role of inositol in hyperlipemic conditions und Dr.V. Srinivasan at Madurai Medical College, Madurai.

Preliminary studies showed that Cholesterol, particularly the fr form, accumulated in the tissues of the organism Coryra Cephalonica s and also in the blood of the albino-rats fed on inositol deficient diet In these studies gammexane, an inositol antimetabolite was used fo producing the inositol deficiency. Based on the results of these studie xperiments were conducted to elucidate the biochemical function c his vitamin in cholesterol metabolism with special reference to its influ nce on the cholesterol esterase activity of liver and pancreas. Th reliminary *in vitro* studies led to the interesting finding that inositol al ost completely reversed the inhibitory effect of gammexane on thi sterase. This *in vitro* study was next extended to *in vivo* studies i bino-rats, where the liver cholesterol esterification was studied in rat aintained on different types of rations which are known to produc tty livers, such as high cholesterol feeding, high fat feeding, pyridoxine ficiency, pantothenic acid deficiency and choline deficiency. Free olesterol was markedly increased under most of the experimental condi- ns used. Cholesterol esterase activity was found to be low in all ino- ol deficient groups and curative studies with inositol brought the enz- ic level in the liver to normal. During these studies it was frequen- noticed that the adrenals showed marked enlargement in inositol ficiency. Therefore, the role of inositol in adrenal cortical function is being studied to see whether this vitamin has any enzymic role in biosynthesis of the adrenal steroids.

23. Study of the effects of selected respiratory stimulants in states of pulmonary insufficiency associated with hypercapnia and hypoxia under Dr. N.R. Konar at the Nilratan Sircar Medical College, Calcutta.

Thirtyone patients with pulmonary insufficiency, diagnosed clinically were selected for studies. In addition to a detailed clinical survey, respiratory function tests, including spirometry and arterial blood gas analy- ses were done before and after administration of a respiratory stimulant. In 23 patients, the tests were carried out before and after intravenous administration of o.24 Gm. of Aminophylline and in 8 patients before and after inhalation of oxygen for 20 mins. Besides these, Oximeter was calibrated against Vanslykes manometric apparatus and maximum breathing capacity test was carried out in 51 normal subjects.

The maximum breathing capacity (M.B C.) in normal subjects was observed to be 116 lit/min/B.T P S (mean value). Statistical analysis showed that the value of M B.C. varies inversely with age and directly to surface area of a subject From this study, it has been found out that the M.B.C. can be predicted in 90 per cent of cases with+20 per cent accuracy from the following formula .—

$$Y = 106.85 + (30\ 93 \times \text{surface area in sq m}) - (1{\cdot}21 \times \text{Age in yrs.})$$

Where Y=predicted M.B.C of a male subject in standing posture.

It was observed that emphysema of lungs, either due to chronic bronchitis or bronchial asthma was the main disease which caused pulmonary insufficiency. In some of the patients, emphysema produced congestive cardiac failure, The rest were patients suffering from bronchopneumonia and tropical eosinophilia (Patients suffering from pulmonary tuberculosis were not included in this study due to practical difficulties) Majority of the patients were between 35 and 45 years, the mean age being 41 years. Most of the patients investigated in this series had chronic diseases of lungs, mean duration of illness being 6 years. The symptoms that were present in patients with pulmonary insufficiency were, dyspnoea of various degrees, cough, fever, pain in the chest, palpitation and oedema in dependant parts. 90 per cent of patients investigated gave a past history of some lung disease.

Regarding respiratory function tests, it was observed that pulmonary ventilation was high in patients with mild pulmonary insufficiency and it was low in patients with severe pulmonary insufficiency. Maximum breathing capacity, as well as the vital capacity, were grossly diminished in patients suffering from obstructive lesions in pulmonary tree. Dyspnoeic index was below 65 per cent in 55 per cent of cases. Air velocity index was less than 1 in obstructive lesions of lung. Timed vital capacity was diminished with prolongation of the time for expiration, in a majority of the cases investigated.

Arterial blood showed anoxaemia and hypercapnia of different degrees.

Slow intravenous injection of o.24 Gm. of Aminophylline resulted in an increase in pulmonary ventilation. This was

chodilatation as evidenced by increase in M.B.C. and vital capacity. There was a slight increase in oxygen content and slight diminution of carbon-dioxide content of arterial blood in most of the cases. This change in oxygen and carbondioxide content in arterial blood was, however, not statistically significant. Oxygen consumption determined in 10 cases after the injection of aminophylline showed an increase in 4 cases and no change in the rest.

Inhalation of oxygen for 20 mins. showed no effect on ventilatory function tests but anoxaemia was corrected to a great extent in all the cases. Arterial blood analyses showed an increase in oxygen content of the arterial blood in all the cases, but in 62 per cent of cases the arterial oxygen saturation did not come up to the normal level. In cases of severe anoxaemia the rate of oxygen consumption was observed to be very rapid at first and was rather steady in later stages when anoxaemia was corrected to some extent. After oxygen inhalation, the carbondioxide content of arterial blood, was raised in only one case out of eight and this was not attended with any diminution of pulmonary ventilation.

24. Inquiry on the pollination calender for Greater Delhi at the Vallabhbhai Patel Chest Institute, Delhi

Botanical field survey was carried out throughout the year to complete our list of allergenic plants of Delhi and to note their pollination seasons In addition to the list already submitted three more plants namely *Ricinus communis*, *Putranjiva roxburghi* and *Dodonaea viscosa* were found to produce and shed abundant amount of pollen. Over 100 plants were collected to serve as herbarium and about 175 reference slides were made to facilitate identification of atmospheric pollens

Atmospheric pollens were studied and recorded daily over a year from the roofs of (1) Patel Chest Institute (2) Lady Hardinge Medical College and (3) Victoria Zenana Hospital (near Jama Masjid) The common types of atmospheric pollens so far indentified are the following :—

(1) Grasses (2) Cyperaceae (3) Chenopodium-Amarantus type
(4) Cannabis sativa (5) Prosopis (6) Pinus (7) Xanthium
(8) [illegible]
(13) [illegible]
(17) [illegible]
(21) Cruciferae (22) Compositae (23) Leguminosae (24) Myrtaceae.

During September and October grass pollens as well as those of the families of Amarantaceae and Chenopodiaceae were predominating. In November and December *Ricinus* and *Xanthium* pollens were abundant while from February to April tree pollens attain their maximum concentration. July recorded the minimum pollens on the slides.

Different methods were tried for different species to collect pollens in large amounts. About 29 types of pollens were collected and their antigens were extracted. These antigens are regularly being used for [illegible] our asthma clinic. Those patients [illegible] also being hyposensitized against [illegible]g finding that has emerged out of these studies is that the pollens of plants like *Putranjira roxburghi*, *Dodonaea viscosa* and *Carica papaya* which have not so far found a place in allergy literature could be allergenic to man.

75. Enquiry on the relative values of colpomicroscopy and vagin cytology in detection of early carcinoma of cervix uteri under D Chinmoy Ghosh at the Calcutta National Medical Institul Calcutta.

From October 1957 to September 1958.

The programme of the work continued on the same lines as h been detailed in the previous report of the work ending September, 19 During the year 442 patients were examined.

They are grouped as follows :—

A. only cytological examination—57 cases.

B. Cytological and Colpomicroscopical Examination—345 cases

C. Cytological, Colp microscopical and biopsy examination—33 cases.

D. Cytological and biopsy examination—7 cases.

The cases according to the previous plan are further regrouped a follows :—

1. Cervix clinically healthy—231 cases.

(a) Colpomicroscopy (C.M.) & Cytology. } Negative in 172 cases.

(b) Only cytology done-negative in—57 cases.

C.M. examination could not be done in this series eithe on account of failure of patients to report back or due to some technical difficulties explained previously.

(c) C.M. Negative; Cytology-Positive—2 cases.

In one case smear showed endometrial type of malignant cells in a postmenopausal woman with healthy cervix which proved to be adeno-carcinoma of the endometrium on endometrial biopsy and subsequent operation.

The other case proved to be a papilliferous cyst-adenocarcinoma of the right ovary without involvement of the endometrium and the tubes.

2. Cervix clinically unhealthy—erosion, excoriation, cervicitis etc., but did not appear clinically maligant—204 cases.

(a) C.M. and Cytology Both negative—188 cases.

(b) Cytology—atypical and suspicious.
C.M. negative
Biopsy negative. } In 11 cases.

All these patients showed active trichomonas infection.

(c) Cytology Negative } 2 cases.
C.M. Suspicious

In one case biopsy of the cervix revealed basal cell hyper-activity. Total hysterectomy for associated pathology and further study of the cervix revealed the composite picture of basal cell hyper activity and preinvasive carcinoma in different area.

The other patient had a normal delivery four months ago and there was no trichomonas infection. Biopsy of the servix showed basal cell activities in some areas. The case is under follow up.

(d) C.M and Cytology— Both positive—2 cases.

Biopsy in one case proved early invasive carcinoma. The other patient did not turn up for biopsy and left touch with the unit*.

(e) Cytology } Both suspicious—1 case.
C.M.

The patient did not turn up for biopsy*

(*) Attempts are being made to contact both the cases.

3. Advanced clinical carcinoma of the cervix, including one with pregnancy—7 cases

Cytology was positive in—6 cases.

C.M. could not be done due to haemorrhage.

Biopsy-Invasive carcinoma in all cases.

26. Induction of gall stone in monkeys under Dr. B.N. Balkrishna Rao at the Medical College, Gwalior.

F.B. nuclei (zinc, magnesium and pieces from human gall stones) were implanted in the gall bladder of monkeys for varying periods, the longest post-implantation period being 986 days. The human gall stone nuclei and magnesium nuclei were completely dissolved in the gall bladder. The zinc nuclei consistently lost their original weight which shows the strong dissolving property of monkey bile. This nuclei dissolving property of the monkeys' gall bladder bile is due to its acid pH.

The failure of F.B. (zinc, magnesium and human gall stone) to incite joint stone formation points to the importance of other factors as the causative agents. It points out that stasis may be, and perhaps is, an important governing factor in the production of gall stones.

At present the effect stasis of bile—by partial obstruction of common bile duct and/or of cystic duct by a silver wire—is being studied.

27. Inquiry into the indigenous materials and methods employed by the people of Andhra Pradesh for the maintenance of health, treatment and prevention of some common diseases under Dr. D. V. Subba Reddy History Osmania Medical College, Hyderabad-Dn. Research Assistant—Dr. V. V. S. Sastry.

I *Study of printed old books in Telugu and English* dealing with herbs and drugs ; notes were taken of herbs and drugs of common use in Andhra Pradesh.

LIST OF BOOKS

1. Watt's Commercial Products of India.
2. Chemistry and Physiology of Vegetable Drugs by N.L. Allport.
3. Herbal Remedies & Receipes and some others by Quelch
4. Waring's Remarks on the Use of Some Bazar Medicines and Common Medicinal Plants of India.
5. Pharmacopoeia of India by Warning.
6. The Useful Plants of India by Drury.
7. Dhanwantari Nighantu (Telugu)
8. Vastuguna Prakasa (Telugu)
9. Siddhamoolika Rahasyam. (Telugu)
10. Vastuguna Deepika. (Telugu)

II. Information gathered from *visits and enquiries among local people* :—

III. Summary of data collected.

1. *Achyranthes aspera* : Linn.—The paste of the leaves applied externally to stop the bleeding from wounds. The paste of the seeds with rice water internally for bleeding Piles The decoction of the plant with Sal Ammonic for hepatic dropsy.
2. [illegible] in [illegible] ter, [illegible] ent [illegible] gh, phtisis, diphtheria etc.
3. *Amarantus Gangeticus* : Linn.—Used as an emollient poultice.
4. *Amarantus paniculatus* : Linn.—Used for purifying the blood. Used in piles and scropula.

5. *Amarantus spinosus* : Linn.—Root is useful in menorrhagia. Plant is used as an antidote for snake poison. Root is also considered a lactogogue.

6. *Aristolochia Indica* : Linn.—Paste of the root used externally for ulcers and eczema and in snake bites and in poisonous issect bites. Decoction of the plant is diuretic and aperient, and is also useful in allergy. Root used in dysentry, fevers and leucoderma.

7. *Aristolochia Tagala* :—Used in leucoderma and in bowel complaints.

8. *Asparagus gonocladus* : Baker.—Decoction of the tubers with Tribulus Terristris in haematuria. Tubers are lactogoguic and aphrodisiac, andare given in gonorrhoea, kidney diseases, rheumatism, and nervous disorders. Juice with cow milk used in epilepsy.

9. *Asteracantha Longifolia* : NEES.—Leaves of this plant and Tribulus Terristris with cow's urine used in stone in the bladder. For sleeplessness a decoction of the root of this plant with root of Solanum Nigrum and that of Achyranthus Aspara.

10. *Azadirachta Indica* : HDR.—Juice of the leaves is used in snake bite. The paste of the leaves prepared out of cow's urine is used for skin diseases, lice, skin lesions of small-pox and chicken-pox. Leaves applied over the breasts reduce milk secretion. Flowers are anthelmintic and are also used in leprosy. Fruits are laxative, anthelmintic and used in eye diseases, and urinary diseases. Oil is used in leprosy, asthma, epilepsy and common colds. When taken in, the oil makes the hair darker. Juice of the bark with honey used in vomitings with honey and ginger in jaundice. Gum is used in dysentry and diorrhoea. Toddy that exudes from old trees acts as tonic and is supposed to be anii-bilious. Kernel of the seeds is fried with oil, ground and mixed with honey and given in severe thirst for woman in puerperium.

11. *Barleria Prionitis* : Linn.—Juice of the leaves used in fevers with lung affections. Ashes of the plant, in cough and urinary diseases.

12. *Calotropis Giganea* : R.B.R.—Tender shoots with betel leaves are given in malaria. Paste of the root with vineger applied externally in elephantiasis. Flowers used in cough and asthma. Juice of the leaves is put in the nostrils in snake bite. For pigmentation of the face, the latex mixed with turmeric is applied.

13. *Carica Papaya* : Linn.—The tender leaves are used with black papper and garlic in jaundice. Unripe fruit is lactogogue and is also used in pheumatoid arthritis. The milky juice is rubbed on the spot for scorpion sting.

14. *Centella Asiatica* : Urban.—Paste of the leaves used in leprosy. Juice of the leaves is used with milk in small-pox and chicken-pox. This plant has often been mistaken for hydrocotyl Asiatica Linn. Powder and juice of the leaves are used for menstrual diseases and syphillis.

15. *Clitoria Ternatea* : Linn.—The paste of the root with sugar, honey and ghee is used for seven days in peptic ulcer.

16. *Curculigo Orchidides* : Goertn —Rhizome is used in spermatorrhoea, sexual weakness, deafness and the same with milk in asthma, leucorrhoea and arthritis.

17. *Datura Fastuosa* : Linn.—The seeds with long papper made into paste with cold water and given in eilephantiasis.

18. *Daucus Carota* : Linn —Root is said to be aphrodisiac, laxative and vermifuge, and is also useful in diabetis, tuberculosis, anaemia, constipation. Juice of the root with breast milk is put in nostrils in hiccup. Leaves useful in migraine.

19. *Eclipta Alba* : HASSK.—Decoction of the leaves internally in uterine haemorrhages.

20. *Euphorbia Pilulifera* : Linn.—Juice of the leaves acts as haemostatic.

21. *Ficus Glomerata* : Roxb.—Bark is lactogogue and it also reduces sugar in urine. Fruits useful in Diabetis. Paste of the bark with breast milk is used in excessive hunger.

22. *Synnema Sylvestra* : BENTH.—Leaves are stated to be good for diabetis.

23. *Holarhena Antidysenterica* : Wall—Bark is used in bleeding Piles.

24. *Hygrophila Spinosat* : ANDERS.—Leaves are useful in jaundice and dropsy. Root is used in rheumatism. The seeds are aphrodisiac.

25. *Justicia Gendarussa* : Linn. f—Decoction of the leaves is diaphoretic and given internally in cephalalgia.

26. *Lgcopersicon Esculentum* : Miller.—Juice of the used with sugar in severe thirst

27. *Momordica Cl* —Leaves with castor-oil taken small-pox. F in diabetis.

28. *Ophiorrhiza M* .—The in scorpion

29. *Passi flora* : Linn.—The flowers are hypnotic.

IV. Information collected during the *visit to Srisailam* on the occasion of the search for herbs and exhibition of the collection by the Ayurvedic physicians.

1. *Aegle Marmelos* : barr.—The tender leaves are diuretic and used in the disease of kidney to reduce swelling of the body. The same tender leaves are supposed to supress hunger.

2. *Cressa Cretica*: Linn.—The juice of the leaves of this plant is supposed to combine with mercury and make it easily amenable to processes used in alchemy.

3. *Coleus Aromaticus*: BENTH.—It is a vermifuge.

4. *Croton Oblongifolius* : Rox B.—It is used in 'Vata' diseases and is considered as a talisman to keep the demons and evil spirits away.

5. *Gloriosa Superba* : Linn.—Root is anthelmintic and used in leprosy, snake bite and scorpion sting.

6. *Mimusops Hexandra*: Rox B.—The fruits are prepared into a drink which is a stimulant and tonic.

7. *Randia Dumetorum* : Lamk.—Fruit is emetic.

8. *Sida Acuta* : BURM.—Used in nervous diseases like paralysis and it is also a stomachic.

28. Effect of tissue therapy in the prevention of blindness due to degenerations and abiotrophies of the retina and choroid under Dr. J. Bose at the R.G. Kar Medical College, Calcutta.

When Filatov described his tissue therapy, his main target was "Retinitis Pigmentosa" or "Primary Pigmentary Degeneration of the Retina". As this disease is rather rare, help from other colleagues has been sought in the collection of cases. The number of new cases rose to twenty six as compared to only nine in the previous year. But strangely enough only one secondary case was received this year, compared to eleven in the previous year.

Before tissue therapy was started, very careful clinical examination of the eye (including records of visual acuity by special Landolt's ... chart, condition of refraction, n
(e g., W.R., Kahn, Mantoux
like perimetry, dark adaptation, scotometry were completed.

Fundi were very carefully drawn by an artist with an approximate magnification of 2½ times. All these data were carefully recorded in a proforma and reserved for future use and comparison.

However, *in* a small percentage of cases despite all the clinical data, definite diagnosis could not be made Evidence of hereditary transmission is always a great help in such border line and atypical cases. As a matter of fact such evidence was obtained in 8 out of 35 Retinitis Pigmentosa cases (female-sex linked, dominant and recessive).

Tissue therapy is a long continued treatment according to Filatov's procedure but Prof. Amsler has modified this to a very short term one. A few of the difficulties in carrying out tissue therapy in our unit were irregular attendance and discontinuation of visits on the part of the patients (14 out of of a total of 35 primary cases and 5 out of a total of 12 secondary cases have discontinued their visits.)

Some young patients were deliberately not given the treatment because of repeated injections and consequent ugly scar formation. In one of them anticoagulant therapy was started.

The number of new primary cases treated is 5, and 5 more are waiting for the treatment. The number of primary cases in the old series who have been receiving this treatment for quite a long period is 5, of whom one completed 4 full courses, one 5 full courses, two 1 course and one only 3 graftings. None of them have shown any objective improvement. One had a moderate subjective improvement, two had definite subjective (and objective) deterioration, while the remaining two showed no change whatsoever.

Among the 11 secondary cases of the previous year, 2 patients have been treated only with specific treatment, 3 with full co[illegible] of t[illegible] therapy along with specific treatment and 2 with partial [illegible] (i.e. either grafting or injection). One of the above I[illegible] courses of tissue therapy, but showed no improvement.

Patients have been irregular in their attendance due to various reasons, namely (i) necessity of an attendant (ii) long distance between his residence and the hospital (iii) economic burden of the repeated visits (iv) accommodation difficulties in Calcutta etc.

One of the technical problems that this unit had to face and which could not be solved even after repeated attempts, was the persistently high percentage of protein present in aqueous extracts of placenta used for above therapy. This necessitated the discarding of the two lots of aqueous extracts prepared at an interval of 2 months.

The above two problems associated with the problem of follow up of the patients in the control group considerably hampered the progress of this enquiry. It is now felt that the patients of the control group should be given some treatment for psychological reasons and the duration of tissue therapy reduced to a shorter interval. It is hoped that with these modifications, the above stated difficulties wlll be surmounted.

29. Inquiry into blood stream cooling as a method of inducing and maintaining hypothermia under Dr A. K. Basu at the S. S K. M. Hospital, Calcutta

The effect and usefullness of a number of cardioplegic drugs in producing cardiac arrest in hypothermic and normothermic animals were studied.

Altogether 32 experiments have been performed so far.

METHOD

Adult monkeys weighing between 10 to 15 kg were the test animals. They were anaesthetized with I V. Pentothal 30 mg/kg body weight, and intratracheal incubation was performed. The intratracheal tube was connected to an automatic respirator, ventilating at the rate of 30-40 cycles per minute. Cooling was effected by the immersion technique and also by rubbing ice on the surface. The range of hypothermia achieved varied from 29°C. to 30°C. Electrocardiographic setup was attached in most of the animals.

Bilateral transternal thoracotomy was performed. The pericardium was extensively opened. The intrapericardial portions of the superior and inferior vena cava were cleared, and the vessels occluded with thick silk thread. After allowing 3 seconds for the heart to empty, the roots of the outflow vessels, viz. the aorta and the pulmonary artery, were [illegible] transverse sinus. The [illegible] t of the aorta distal [illegible] In a few cases it was injected into the left ventricle. After the estimated period of arrest, the outflow clamp was released first, followed by the superior vena cava loop. The inferior vena cava loop was released last. For resuscitative measures manual cardiac massage, injections of atropine in some of the acetyl choline cases, injections of calcium salts and in a few cases coronary infusions of 10 per cent sodium lactate solution were used.

MATERIAL :

Acetyl Choline Arrest

Comments:—Acetyl choline arrest is immediate and occurs within a few seconds of the injection of the drug. In contrast to potassium induced arrest, the myocardium is not completely flaccid. The duration of the arrest period however, is variable, lasting from a few seconds to 2 minutes. the arrest is often incomplete. The duration of the arrest [illegible] after injection of 300 mg of acetyl [illegible] during the recovery phase is less [illegible] arrest, and the survival rate of the animals is higher. Injection of atropine quickly reverts this fibrillatory phase. In normothermic animals with acetyl choline, the incidence of fibrillation during the recovery phase is relatively infrequent.

Potassium Induced Arrest.

there was a variable latent time interval between the injection of the drug and the onset of the arrest phase.

The recovery phase from the arrest stage was always associated with a fibrillatory episode much more marked than with acetyl choline. The release of the inflow occlusion after the arrest period is marked by significant dilatation of the heart. The duration of the arrest period varied from 5 minutes to a maximum of 17 minutes.

Discussion :—From the surgical point of view, potassium induced arrest is advantageous as the flaccid heart of long duration would allow better visualization and facilitate accurate correction of the intracardiac defects. The great disadvantage is the higher incidence of ventricular fibrillation in the recovery phase in almost all the cases.

For the resuscitation of the heart, cardiac massage, if continued for a long time, does revert the abnormal rhythm in many cases. Use of calcium chloride in two cases brought about successful reversion. The effect of sodium lactate infusion in the coronary system was uncertain, and 4 of the 7 animals subjected to this method, died. It has been stated that infusion of oxygenated whole blood in the coronary system would diminish the incidance and severity of the fibrillatory complication therefore, further experiments are being carried out in this direction. Hypothermia is of great value when induced cardiac arrest is brought about by potassium salts. Its value in acetyl choline induced arrest is less certain.

30. Investigation into the pathogenesis of spinal concussion following injuries of spine under Dr. H K. Sarkar at the S. S. K. M. Hospital, Calcutta.

I. Conditions akin to spinal concussion were produced in rabbits in three stages.

(i) Weakening of the stability of cervical segment of spine by dividing the intervertebral ligaments between spines and laminae from behind in one space.

(ii) A [illegible] produced under X-ray [illegible] complete or partial [illegible] limbs.

(iii) Animals were killed at varying intervals after 2nd stage by intravenous injection of mag. sulph. Spinal cords were dissected out for histopathological study

II. *Study of the vascular pattern of the spinal cord in rabbits by injection technique.*

Five experiments were carried out by injection of a dye (1 in 10 [illegible] root of the aorta [illegible] *experiments* and in [illegible] great vessels were immediately clamped after injection after which the animals died. The cervical segments of spine were preserved to study the distribution of the dye in the spinal cord histologically.

Experiments are being continued in this line with other dyes and a reproducible method is yet to be developed.

III. *Study in human cases :—*

A. *Clinical study*—Ten cases of cervical spinal injury were studied from different hospitals. They are classified as follows :

(1) Complete motor and sensory loss—5 cases.

(2) Complete motor loss and sensory escape—3 cases.

(3) Incomplete motor and sensory loss—one case.

(4) Brown-sequard type of lesion, sensory loss on one side and motor loss on the other side—one case.

B. *Pathological study*—Five specimens of the injured portion of the spine along with the spinal cord, of the above-mentioned patients were collected after post-mortem. The distribution of these cases in the clinical groups mentioned above is as shown below :—

Clinical classification	(1)	..Two specimens.
,, ,,	(2)	..Two specimens.
,, ,,	(3)	..Nil
,, ,,	(4)	..One specimen.

The spinal cords showed the following features, macroscopically.

(a) Oedema with fusiform bulging, maximum at the site of dislocation with extension above and below for about 3 c.m. in 3 cases.

(b) Congested blood vessels on surface of the piamater in 3 cases.

31. Hydrocephalus in infents and children-investigation of its etiology and treatment under Dr. R. Nigam at the Medical College, Nagpur.

A. *Experimental.*

1. *Production of hydrocephalus by intrathecal injections of—*

(a) *Indian ink.*—Twenty three adult albino rats and five dogs were given either a single injection or repeated injections of a 20 per cent suspension of Indian ink. The immediate mortality was 13 per centin the rats and nil in the dogs. Autopsies were carried out either when the animals died naturally or by sacrificing them at varying intervals The maximum period or observation was 35 weeks. The findings were as follows :—

(i) Hydrocephalic changes were observed in 50 per cent albino rats and 75 per cent dogs.

(ii) The interval of time since first injection, was in no way related to the degree of hydrocephalic changes observed

(iii) The ink was found deposited prominently in the basal cisternae, in the cells of the arachnoid and pia This was mainly perivascular in its distribution The dura and the brain substance were free from ink. In 50 per cent of the rats and all the dogs the meninges were grossly thickened and adherent Ventricular dilatation was most prominent in the anterior horns. The hydrocephalus was of the communicating type, the interventricular foramina being widely patent. Rotrograde filling of the ventricles was observed in a few animals. The choroid plexus was not involved.

Histological examination revealed Indian ink deposits in the lining meningeal cells, particularly in the cells along the sulci and the spaces of Virchow-Robin, Atrophy of the cortex and of the basal ganglia was observed along with oedema of the nerve cells.

(b) *Suspensions of Mycobacterium Tuberculosis* were injected into ... Only 4 per ... with ventri- ... nse in both ... ctions. One animal exhibited an arachnoidal cyst formation.

(c) *Suspension of kaolin* was given to 13 albino rats. Immediate mortality was 60 per cent, Hydrocephalic changes wereobserved in only 15 per cent of animals. This substance is not considered suitable for this type of work.

2. *To evaluate the suitability of polythene tubing for shunt operations:*

(*I*) *Peritoncal cavity*-tubing 0.2" diametor was ... h one end in the peritoneal cavity in ...

rabbits over a period of three months. The tube was found to be filled with serum and a feeble fibrin clot, and water could be run through the tube freely at a pressure of 60 to 80 min.

(2) *Ureter*—Peolythene tube 0.1" diameter was inserted into the ureters of seven dogs. No evidence of obstruction was observed in any of the animals.

B. *Clinical*

Fourteen hydrocephalic children were included in the study. The etiological factor was congenital malformation in a majority of cases. Only in one case, laboratory evidence of tuberculous meningitis was observed. *Syphilis was not an etiological factor in any case.*

The site of obstruction was localised by ventriculography and indigo carmine test. Ten cases were thus investigated. Ventriculography was associated with a mortality of 20 per cent. Four cases were of the communicatiug type and the rest, ventricular type.

Ventriculo-peritoneal shunt was performed in nine cases and the results were as follows :-

1. Good result	(improved symptoms and) (reduction in size of head)	3 cases.
2. Fair result	(improved symptoms with sta-) (tionary head circumference)	3 cases.
3. Failure including operative deaths		3 cases.

Three cases have been followed up, the maximum period of follow-up being seven months.

In the operative technique, a modification found most suitable was to twist in a spiral form, the peritoneal and ventricular ends of the tube prior to insertion. This procedure fixed the tube in position and prevented it from slipping out in the post-operative period.

32. Clinical and experimental studies on keloids under Dr. K. K. Ghosh, at the Medical College, Calcutta.

Up to the end of September, 1958, 74 cases have been subjected to investigation and treatment by different methods. Only the cases of primary keloids were selected irrespective of sex, age and duration for the purpose of this investigation.

Out of the 74 cases, 31 were males and 43 were females. The age incidence was as follows :—

1 to 10 years	2 cases.
11 to 20 ,,	36 ,,
21 to 30 ,,	20 ,,
32 to 40 ,,	13 ,,
to 50 ,,	3 ,,

After filling in the preliminary details according to the proforma submitted last year, the patients were subjected to:

(a) *Ultra-violet fluroscopic examination for determination of the* nature of blood supply and diffusion of extracellular fluid.

(b) Biopsy—for noting the structural detail.

Basing on the results of ultra-violet fluroscopic examination, the size of the keloid and its duration, the patients were subjected to different lines of treatment as mentioned below :

Deep x-ray in conjunction with surgery ..	52
Cortisone infiltration alone ..	11
Cortisone infiltration with surgery ..	10
Surgery only ..	41

As soon as the course of treatment was completed, the patients were again subjected to ultra-violet fluroscopy and histopathological examination for noting the changes in the tissue brought about as a result of the treatment.

The cases are now *being followed* up with particular reference to regression or recurrance.

The details of the treatment.

Group I. Consisting of 52 patients were subjected to Preoperative and post-operative x-ray therapy along with various types of surgical treatment.

Sub-Group : (a) . In 34 patients, the keloidal area was subjected a course of x-ray therapy following which the keloid was removed

and the skin was sutured with least tension using non-irritating suture material e.g, fine silk, nylon and silk worm gut. On completion of wound healing (practically in all by primary intention), the operated area was subjected to a further course of x-ray therapy. In each course 1459 r was administered in 4 days time over a mederate sized keloid.

(b) This sub-group consisting of 7 cases were operated after a course of x-ray therapy and the raw area produced as a result of the removal of the keloid was covered with a skin graft. Following healing of the wounds, the grafted as well as the donor area was treated with x-ray therapy post-operatively with the standard dose.

(c) This group of 8 patients were operated after pre-operative x-ray therapy over the keloidal area and the raw area thereby produced was covered with a skin graft—removed from a previously irradiated donor site on the outer aspect of the thigh. Following healing of the wounds, both the areas i.e. the grafted and the donor were again subjected to a course of x-ray therapy using the standard dosage.

(d) The last sub-group of 5 patients, after pre-oprative x-ray therapy, the keloid was removed in stages from its central part (serial re-section). On completion of the remevel, the area was subjected to x-ray therapy.

Second Group : Consisting of 11 patient only, were subjected to cortisone infiltration alone in the keloid itself as well as in the peri-keloidal zone.

The usual plan of this mode of treatment was weekly or bi-weekly injection of Cortil Acetate (1 c.c. in the keloid and peri-keloidal zone) icc.—25 mg, up to 10 such infiltrations.

Third Grroup : Consisting of 10 patients only, was subjected to local cortisone infiltration following surgical removel of the growth and subsequent suturing of the area.

The plan of this mode of treatment is as follows :

The keloid was excised, the healthy marginal tissue was snbsequently infiltrated with undiluted cortison 1 c.c., and then the skin was sutured. Following removel of the stitches on the tenth day, the infiltrations were made at weekly interval.

Fourth Group : Consisting of one patient alone was subjected to surgical removal of the keloid and subsequent suturing of the area.

OBSERVATIONS :

U.V. Fluoroscopic examination was done in 68 cases. The first evidence of fluorescence appeared within 45 sess. of the completion of injection in faint streaks over the keloid and in the peri-keloidal zone which gradually became denser,

This fluoresence which was noticed in the untrea
seen to be grossly interfered in most of the cases treated by different methods.

In the first group of 52 patients treated with x-ray therapy 48 patients were subjected to this investigation.

Out of these 48 patients—only 13 did not show much alteration following treatment with x-ray therapy, and in all these patients recurrence were noticed, though the pre-treatment histological appearances of these cases were no different from those where there were no recurrences. In cases with multiple keloid and in some where the history of trauma was difficult to elicit showed maximum fluorescence in the zones-where the keloids usually occurred, viz, front of the chest, middly portion of the front of the abdomen and the outer and anterior aspect of shoulder joints.

The dimunution of fluorescence was maximum in the peri-keloidal zone and least in the keloidal portion in subjects who responded to this method of examination. In cases treated with cortisone the peri-keloidal fluorescence was not much interfered, the kelold, however, was less fluorescent.

It appears that the vascularity and the extracellular diffusion in the untreated cases is definitely more than the rest of the skin surface and in susceptible cases subjects, the areas mostly affected by this disease shows more vascularity and diffusion.

This diffusion is definitely reduced by x-ray but not much with cortisone infiltration.

OBSERVATIONS ON THE LINES OF TREATMENT.

In the first sub-group of 34 cases, 8 had slight or full recurrence from within 3 to 10 weeks from completion of treatment. In all these cases where there were no recurrence showed broadening of the scar. This broadening was invariable in cases where the keloid was situated over the chese (sternum) or shoulder—suggesting the stress and strain to which these regions are usually subjected. The recurrent keloids were subsequently treated by local cortisone infiltration and all the cases have subsequently become asymptometic but for swelling which has not subsided completely.

The Second sub-group.—Consisting of 7 patients where a skin grafting was done and the donor area was irradiated post-operatively.

Marginal recurrences were noticed in 4 and keloid formation on the donor area were noticed in 6 patients. The recurrent keloid in all these cases were brighly fluorescent.

The third sub-group. of 8 patients where in addition to the usual plan of x-ray therapy with surgery—the donor area was treated just like keloidal one with pre and post-operative irradiation—only 4 showed marginal recurrence in course of five weeks but in none the donor area

khibited the slightest ten dency of keloid formation though one had ıultiple keloid on her.

The fourth group of 5 patients—serial resection in the central portion : the keloid exhibited interesting phenomena. The union line never ıowed any thing beyond a fine incisional scar and keloid formation on ıe incisional line over the keloid were never noticed. The result of ıal excision of the keloid cannot be stated at present.

Second group of 11 patients-consisting of incisional keloid follow- ıg paramedian abdominal incision showed excellent result following ıfiltration with local acting cortisone. Period and dosage of admini- ation was 1 c.c.—25 mg. of cortisone in the keloid as well as in the ɔri-keloidal zone—up to 10 such at weekly interval. In all these pati- ıts, the keloids subsided completely following the completion of treat- ent and on an average from 10 to 14 weeks. In two of these keloid ıbsided completely following the 3rd injection.

In practically all the swelling was asymtometic following the third filtration. The puncture points on the keloids never gave rise to any rm of furher hypertrophy on the keloidal surface. The oldest keloids in ıese series was less than 6 weeks old.

The third group of ten patients-where cortisons infiltration was ıpplemented with surgery-the results have been most unsatisfactory ıd there was complete recurrance in 9 cases in less than 4 weeks time spite of weekly cortisone infiltration starting from the time of opera- ɔn.

Fourth group of 1 patient where ordinary surgical removal was sorted showed recurrence in two weeks time in spite of healing by pri- ary intention.

Observations on Histopathologscal Studies.

The normal structural pattern-as stated in the previous report shows e following characters. The covering epidermis resembles the struc- re of normal skin excepting :–

(a) occasional areas of parakeratosis.

(b) absence of apparadages in the secondary keloids and their pre- sence in lesser number in the primary ones.

(c) The subepidermal layer shows the collagenous connective tis- sue layer-where there are masses of spindle shaped-fibroblastic cells of various size and thickness, with abundant collagenous matrix, The immediate subepidermal layers shows loosely wo- ven collagenous material. Blood vessels consists of endothe- lium lined capallaries. Occasional areas of proliferating endo- thelial cells are also seen in this zone.